

User's Guide for Microsoft® Visio® 2000

Professional Edition *For Fast and Efficient IT Diagrams*



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Welcome to Microsoft Visio 2000, Professional Edition



Microsoft® Visio® 2000, Professional Edition gives you the tools to visualize your information technology infrastructure, create superior databases, plan new software systems, and analyze your business processes.

With Visio 2000, you can easily

- Diagram your corporate network using data in a database or spreadsheet.
- Design and document your network directory service structure.
- Diagram a Web site to visualize and reorganize its links.
- Reverse engineer databases to understand their organization or design databases using entity relationship notation.
- Design and document software projects using object-oriented methodologies.
- Analyze and redesign business processes using proven business process methodologies.

Topics in this chapter

<i>Finding the information you need</i>	<i>6</i>
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Finding the information you need

Visio 2000 gives you wizards, templates, stencils, shapes, and drawing tools to quickly create effective professional diagrams.

The *Microsoft Visio 2000, Professional Edition User Guide* covers the fundamentals of Visio 2000, and focuses on the drawing types and methods you're likely to use most often.

In this User Guide, you will find

- Descriptions of new and improved features.
- Visio basics, including everything you need to know to start creating diagrams quickly and efficiently.
- Conceptual discussions, step-by-step procedures, and helpful tips for creating professional diagrams.

You can also view this guide online by installing the .pdf files located in the Docs folder on the Visio 2000 CD.



This symbol in the margin accompanies useful hints and how-tos.

In addition to this guide, the following resources offer a wide range of information about working with Visio products.

Online Help

This book provides the big-picture information for working in Visio 2000. More details and how-to information are just a click away in the online Help.



Throughout this book, this cross-reference icon indicates that more information on that topic is available in online Help. To see the additional information, just search online Help using the keywords provided.

To search online Help for a keyword

- 1 Press F1, and then click the Index tab. (If necessary, click the Show button.)
- 2 Under Type In The Keyword To Find, type the keyword you want to use. (Keywords are listed under the cross-reference icon.)
As you type, the index scrolls to that keyword.
- 3 Select the keyword you want, and then click Display.

Installation

For information about installing your Visio 2000 program, refer to the Quick Reference card included in the product box.

Visio on the Web

To reach Visio Corporation and the Visio Knowledge Base on the World Wide Web, in Visio 2000 choose Help > Visio On The Web.

The Visio Web site contains information on service releases, support forums, and training opportunities. You'll find the Visio Web site at:

- www.visio.com

For tips on using Visio 2000, articles on product-related issues, and answers to frequently asked questions (FAQs), search the Visio Knowledge Base at:

- www.visio.com/tskb/index.html

Sources of other information

More resources for getting the answers you need to work efficiently in your Visio 2000 application are available.

- The *Developing Visio Solutions* manual is available to order and contains information for anyone who wants to build custom shapes or solutions with Visio applications.
- For information about Technical Support, in Visio 2000 choose Help > Visio Help, and then on the Contents tab, look under the Technical Support heading.

Navigating the Visio Help window

The first time you choose the Visio Help command or click F1, the Visio Help window opens. You can use the following tabbed pages in the navigation pane of the Help window while you work.

Contents Contains headings with topics listed below. Click the plus sign (+) to expand the heading and see the topics.

Index Contains index terms. Click this tab to view and search index entries.

Favorites Contains topics you designate for quick reference.

The navigation pane appears by default the first time you open Help. You can open or close the navigation pane, select a tab in the navigation pane, and resize or reposition the Help window. Each time you open Help, the window appears in the same configuration as the last time you used it.

To hide the navigation pane

- Click the Hide button () on the Help window toolbar.

To show the navigation pane

- Click the Show button () on the Help window toolbar.

Get help quickly while you work

For help about	Do this
Concepts, terms, features	Press F1, click Search (if necessary, click the Show button), and then type your question to use the Visio intelligent search capability.
Shapes	Do one of the following: • Pause your pointer over the shape in the stencil window until a ScreenTip appears. • Press F1, click the Index tab (if necessary, click the Show button), type the name in the index text field, and then click Display. • Right-click a shape on the page or the stencil, and then choose Help.
Menu commands	Press F1, click the Index tab (if necessary, click the Show button), type the name in the index, and then click Display.
Dialog boxes	Click the Help button (?) in the dialog box.
Automation, ShapeSheet® spreadsheet	Choose Help > Developer Reference.

What's new in Visio 2000, Professional Edition

New and powerful additions to Visio 2000 make it easier than ever to create professional diagrams.

Common tasks made easy

You can work faster and smarter using a core group of enhanced features that all Visio 2000 products share.

- Easily create custom data for shapes that you can later use for reports.
- Set tabs, margins, and hanging indents using a text editing ruler.
- Nudge selected shapes using the arrow keys for precise placement in your diagram.
- Easily navigate, rearrange, and rename pages using page tabs.
- Edit groups the same way you edit regular shapes.
- Edit stencils directly in the drawing window.
- Customize menus and toolbars.
- Perform tasks right in the drawing window using quick editing windows. The following table lists the window types and the tasks you can perform.

Quick editing windows in Visio 2000

Window type	Purpose
Pan & Zoom window	Easily zoom in or out with increased precision
Custom Properties window	View and edit a shape's custom properties
Size & Position window	Change a shape's size, position, or rotation
Drawing Explorer window	View all of the elements in your document

New and enhanced information systems solutions

Visio 2000 information systems solutions make it easy to assemble industry-standard diagrams.

Network diagrams

- Create LAN, WAN, wiring closet, server room, and telecommunications diagrams.
- Document and diagram Microsoft Active Directory®, Novell Directory Services® (NDS®), and LDAP (Lightweight Directory Access Protocol) compliant directory services.
- Use the network-specific Custom Properties fields to create, store, and report on data associated with the shapes in your diagram.

Database diagrams

- Create a detailed picture of leading database management systems (DBMSs).
- Reverse engineer databases using drivers for leading DBMS vendors, such as IBM, Informix, Microsoft, Oracle, and more.
- Reverse engineer tables, views, relationships, primary or foreign keys, and code, such as triggers, stored procedures, and check clauses.

UML diagrams

- Document the entire software development process using any UML 1.2 drawing type.
- Reverse engineer code from Microsoft Visual Basic®, Visual C++®, and Visual J++®.

Internet diagrams

- Create high-level, conceptual diagrams of new Web sites to stimulate discussion of the sites' purpose, content, and overall structure.
- Generate maps of existing Web sites to analyze their organization.
- Troubleshoot errors and missing hyperlinks.

Data Flow diagrams

Create data flow diagrams that include as much or as little detail as you need.

Choose from

- Basic diagram-only data flow diagramming.
- Advanced, model-based data flow diagramming, including model navigator, semantic error checking, and level balancing.

New and enhanced business solutions

Visio 2000 business solutions make it possible to create diagrams that communicate your ideas clearly and effectively.

Process flowcharts

- Use bands in flowcharts to show the relationships of cross-functional processes over time.
- Cross-reference information to processes in or between flowcharts and different shapes in flowcharts using improved shape numbering and off-page reference shapes.
- Import existing flowchart information from other applications using the new Import Flowchart Data Wizard.

Organization charts

- Format and update organization charts with shapes that automatically connect and stay glued as you drop them on the page.
- Align and format your entire organization chart with a single mouse click, using a floating format palette.
- Show or hide subordinates, or create a synchronized view of your organization chart on a separate page.
- Define how each page of your organization chart will display on the page.
- Import and export information to a file.
- Create a list of changes to the organization chart from one diagram to another.

PERT charts

- Create high-level projects quickly and easily using preconfigured PERT (Program Evaluation and Review Technique) chart shapes.

Gantt charts

- Add and delete columns for information such as Start Date, End Date, and Duration in project timeline charts, called Gantt charts.
- Perform common tasks such as linking and unlinking tasks, and promoting, demoting, and deleting tasks, by using the Gantt Chart toolbar or Gantt chart menu commands.
- Import files in Microsoft Project format and display the data in a Visio 2000 Gantt chart, in MPX format.

Presentation graphics

- Use new backgrounds, borders, titles, Internet buttons, and three-dimensional (3-D) network shapes to add visual power to your Visio diagrams.
- Create a more polished presentation in a fraction of the time with enhanced Microsoft PowerPoint® compatibility.

Calendars

- Add special dates or shapes to monthly and yearly calendars.
- Create monthly and yearly calendars using new shapes, and then set the format you want to use.

Maps

- Add new custom line styles for roads and railroad tracks in directional maps to make them look more realistic.
- Add intelligence to sign shapes in directional maps, so they pick up road types based on styles and legend/key shapes.
- Display features such as lakes or rivers on more detailed geographic maps.

Office layouts

- Quickly lay out office floor plans using room and space shapes to automatically create walls and dimension lines.

Solutions and where to go for help

This guide provides the big-picture information for working in your Visio product. The details and how-to information for working in

all solutions are available in the online Help. Refer to the following tables to find out where to go for help about a particular solution.

Database modeling solutions

Solution	Description	Where to go for help
Bachman	Create entity relationship diagrams for data modeling in relational databases and information systems design using Bachman notation.	Search for <i>Bachman</i> in online Help.
Chen	Create entity relationship diagrams using Chen ERD notation.	Search for <i>Chen</i> in online Help.
Database Model Diagram	Create relational and object-relational database models.	Chapter 6, "Design database models"
Express-G	Create entity-level and schema-level diagrams using Express-G notation, the graphical component of the Express formal information requirements specification language.	Search for <i>Express-G</i> in online Help.
Martin ERD	Create object-oriented analysis and design diagrams using Martin ERD notation.	Search for <i>Martin ERD</i> in online Help.
ORM Diagram	Create a conceptual data model using Object Role Modeling notation.	Chapter 6, "Design database models"

Networking solutions

Solution	Description	Where to go for help
Active Directory	Design accurate and efficient directory structures that are compliant with a Microsoft Active Directory schema.	Chapter 2, "Design and document your network"
Conceptual Web Site	Create a high-level diagram of content on and navigation through a new Web site, or reorganize an existing Web site.	Chapter 4, "Plan and map Web sites"
LDAP Directory	Create a general-purpose directory service network diagram that is descended from the original Directory Service X.500.	Chapter 3, "Document directory services"
Logical Network Diagram	Create logical diagrams that describe the structure and scope of networks.	Chapter 2, "Design and document your network"
Network Diagrams	Plan and document simple networks, and track equipment by associating serial number and location data with shapes.	Chapter 2, "Design and document your network"

Networking solutions (continued)

Solution	Description	Where to go for help
Novell Directory Services	Design accurate and efficient directory structures that are compliant with Novell Directory Services schema.	Chapter 3, "Document directory services"
Web Site Map	Generate a site map of an existing Web site to analyze the details of the site—such as the organization and navigation patterns—and classify the content.	Chapter 4, "Plan and map Web sites"

Software modeling solutions

Solution	Description	Where to go for help
Booch OOD	Create object, class, timing, state, module, and process diagrams using Booch object-oriented design notation.	Search for <i>Booch</i> in online Help.
COM and OLE	Create COM (Component Object Model) objects, interfaces, and system diagrams.	Search for <i>COM and OLE</i> in online Help.
Data Flow Model Diagram	Create data flow diagram models using Gane-Sarson notation. Includes a model navigator, semantic error checking, and automatic level balancing.	Search for <i>Data Flow Model Diagram</i> in online Help.
Fusion	Create diagram types included in Fusion methodology.	Search for <i>Fusion</i> in online Help.
Jackson	Create data and program structures using the Jackson software design method.	Search for <i>Jackson</i> in online Help.
Jacobson Use Case	Create use case, state transition, interaction, and other diagrams included in the Jacobson object-oriented software engineering method.	Search for <i>Jacobson Use Cases</i> in online Help.
Nassi-Schneiderman	Represent sequence, selection, case, and repetition in program structure charts.	Search for <i>Nassi-Schneiderman</i> in online Help.
Program Structure	Create structural diagrams of programs and memory objects.	Search for <i>Program Structure</i> in online Help.
ROOM	Create Real-Time Object-Oriented Modeling (ROOM) diagrams.	Search for <i>ROOM</i> in online Help.
Rumbaugh OMT	Create object, dynamic, and functional diagrams using the Rumbaugh Object Modeling Technique.	Search for <i>Rumbaugh OMT</i> in online Help.
Shlaer-Mellor	Create class diagrams, class structure charts, dependency diagrams, and inheritance diagrams using Shlaer-Mellor notation.	Search for <i>Shlaer-Mellor</i> in online Help.
SSADM	Create logical data structures, data flow diagrams, entity life histories, and other system analysis and design diagrams.	Search for <i>SSADM</i> in online Help.

Software modeling solutions (continued)

Solution	Description	Where to go for help
System Structure	Create diagrams that represent Microsoft Windows® and Macintosh operating systems and user interfaces.	Search for <i>System Structure</i> in online Help.
UML	Create integrated UML system models. Reverse engineer Microsoft Visual C++, Visual Basic, and Visual J++ code into UML models. Uses the entire UML 1.2 notation.	Chapter 5, "Design software components" Also, search for <i>UML</i> in online Help.
Windows User Interface	Develop, document, and prototype Microsoft Office and Microsoft Windows user interfaces.	Search for <i>Windows User Interface</i> in online Help.
Yourdon and Coad	Create object state, data flow, and other diagrams included in the Yourdon and Coad object-oriented analysis and design notation.	Search for <i>Yourdon and Coad</i> in online Help.

Additional Visio solutions

Solution	Description	Where to go for help
Audit Flowcharts	Document and analyze processes that involve financial transactions or inventory management.	Search for <i>Audit flowcharts</i> in online Help.
Basic Diagrams	Create drawings for brainstorming, planning, and communication.	Search for <i>Basic diagrams</i> in online Help.
Block Diagrams	Create drawings for brainstorming, planning, and communication. Create tree diagrams that represent hierarchies and onion diagrams.	Search for <i>Block diagrams</i> in online Help.
Block Diagrams with Perspective	Create drawings using geometric shapes that have a 3-D appearance.	Search for <i>Block diagrams with perspective</i> in online Help.
Calendars	Create a calendar for a month or a year on a single page.	Chapter 9, "Plan your project"
Cause-and-Effect Diagrams	Document all factors that contribute to or affect a given situation. Also called Ishikawa, fishbone, or characteristic diagrams.	Search for <i>Cause-and-effect diagrams</i> in online Help.
Charts and Graphs	Create charts and graphs for presentations and reports.	Search for <i>Charts and graphs</i> in online Help.
Cross-Functional Flowcharts	Show the relationship between a business process and the organizational or functional units—such as departments—responsible for that process.	Search for <i>Cross-functional flowcharts</i> in online Help.
Data Flow Diagrams	Document the logical flow of data through a set of processes or procedures.	Search for <i>Data flow diagrams</i> in online Help.
Directional Maps	Create easy-to-read maps that use clearly identifiable roadways, metro routes, and landmarks.	Search for <i>Directional maps</i> in online Help.

Additional Visio solutions (continued)

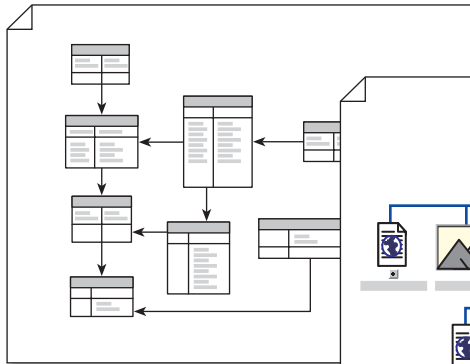
Solution	Description	Where to go for help
Flowcharts	Describe or analyze processes, document procedures, indicate work or information flow, and track cost and efficiency.	Chapter 7, "Use flowcharts to analyze your business"
Form Design	Create business forms, such as invoices, product orders, customer information profiles, and inventory records.	Chapter 10, "Other business diagrams: office layouts, maps, and forms"
Gantt Charts	Schedule, plan, and manage projects.	Chapter 9, "Plan your project"
Geographic Maps	Create detailed maps of countries, continents, and regions with their geographic entities—including lakes and rivers—in correct relationship to one another.	Search for <i>Geographic maps</i> in online Help.
IDEF0 Diagrams	Model business and organizational processes.	Search for <i>IDEF0 diagrams</i> in online Help.
Marketing Diagrams	Create drawings for process modeling, benchmarking, simulation and improvement, path routing, time and cost analysis, activity-based costing, product portfolios, scope and marketing mix, product life and adoption cycles, market and resource analysis, and pricing matrices.	Search for <i>Marketing diagrams</i> in online Help.
Mind Maps	Brainstorm and take notes.	Search for <i>Mind maps</i> in online Help.
Office Layout Drawings	Draw floor plans for individual rooms or for entire floors for your building—including the wall structure, building core, and electrical symbols.	Chapter 10, "Other business diagrams: office layouts, maps, and forms"
Organization Charts	Graphically represent the interrelationships among people, operations, functions, and activities in an organization.	Chapter 8, "Chart your organization"
PERT Charts	Plan and monitor projects, organize tasks, establish time frames, and show tasks that are dependent on other tasks.	Chapter 9, "Plan your project"
SDL Flowcharts	Create object-oriented flowcharts that document communications and telecommunications systems networks using a format designed to International Telecommunications Union standards.	Search for <i>SDL flowcharts</i> in online Help.
Timelines	Create linear timelines that illustrate milestones and events over the life of a project or process.	Chapter 9, "Plan your project"
TQM Flowcharts	Document processes graphically, compare current and ideal processes, and understand how steps in the process work together.	Search for <i>TQM flowcharts</i> in online Help.
Work Flow Flowcharts	Describe, analyze, and document processes in an organization.	Search for <i>Work flow flowcharts</i> in online Help.

Gallery of sample diagrams

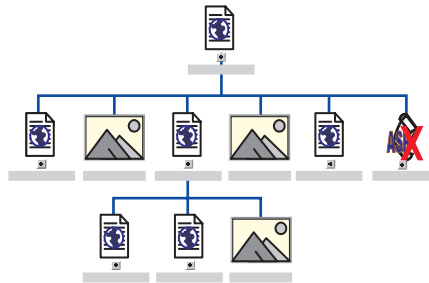
Visio 2000 provides solutions designed to make your work easier, whether you're developing software and databases, designing networks, planning and managing business processes and work flow, or creating project timelines, organization charts and other standard business diagrams.

The samples on the following pages represent just a few of the many types of diagrams you can create with Visio 2000. For a complete list of solutions provided in Visio 2000, see the preceding table.

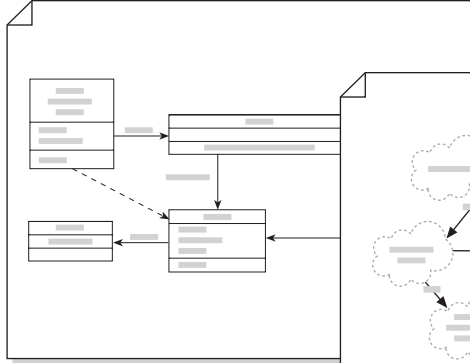
Database diagrams
Use database diagrams to reverse engineer detailed database information.



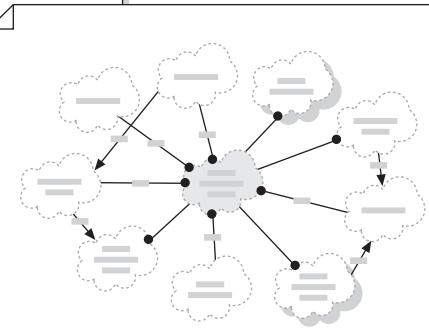
Web documentation
Create Web documentation to automatically map existing Web sites.



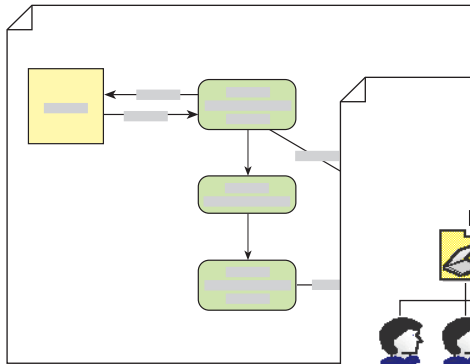
UML diagrams
Use UML diagrams to document an entire software development process.



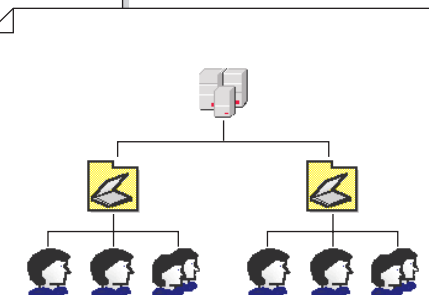
Application development—Booch notation
Use application development diagrams to design a software user interface.



Data Flow diagrams
Use data flow diagrams to illustrate how data flows through a system or program.

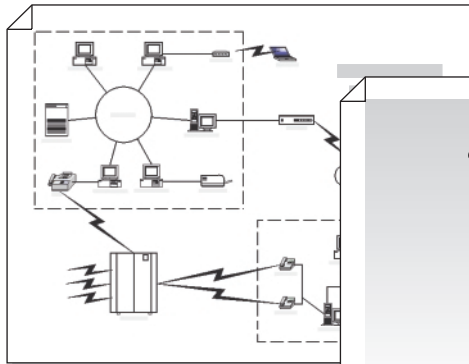


Active Directory diagrams
Use Active Directory diagrams to design accurate and efficient directory structures.



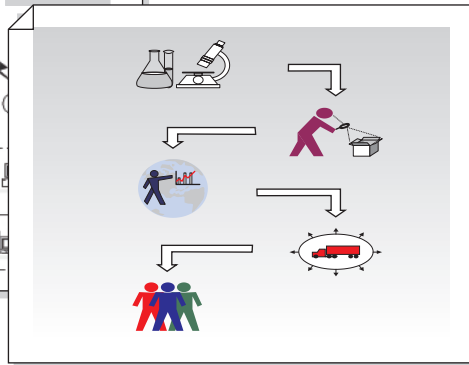
Network diagram

Use Network diagrams to plan and document simple networks, and track equipment by associating serial numbers and location data with shapes.



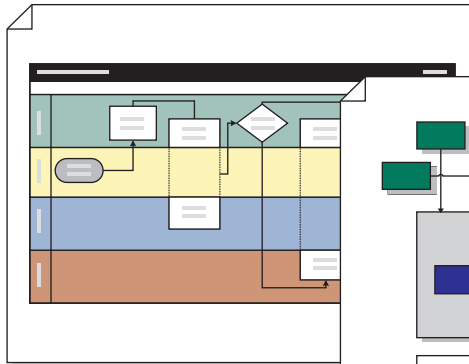
Work flow

Use work flow flowcharts to illustrate the processes and information flow in industry and manufacturing.



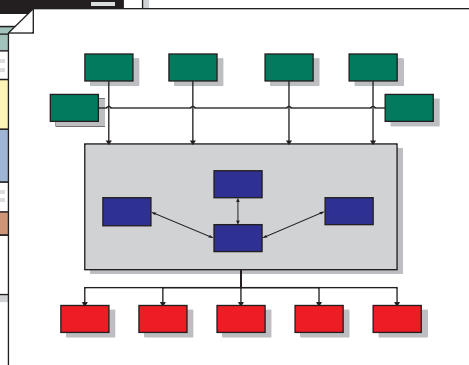
Cross-functional flowchart

Cross-functional flowcharts show how processes flow through functional areas of your organization.



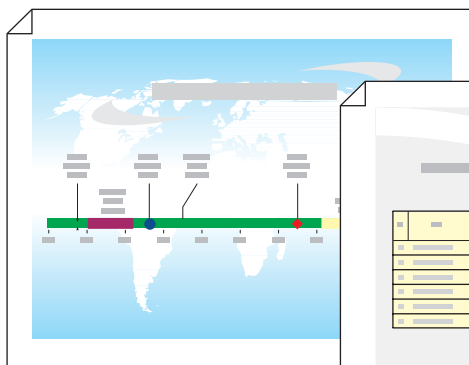
Block diagram

Create block diagrams for communicating, brainstorming, and planning.



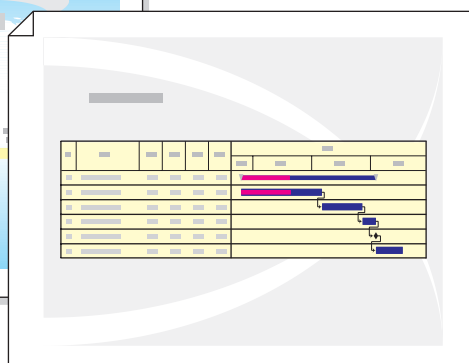
Timeline

Create timelines to see high-level tasks and project milestones at a glance.



Gantt chart

Plan, modify, and link tasks using project timelines, called Gantt charts.





Visio basics

While each template in Microsoft® Visio® 2000, Professional Edition contains a unique set of shapes, tools, and styles, some tasks are common to all types of Visio diagrams.

This chapter explains the diagram tasks that can get you started using the Visio program in minutes, regardless of the type of diagram you're creating.

This chapter begins with an overview of the diagram process, and then describes how you can

- Create your diagram.
- Work with stencils and shapes.
- Add and edit text.
- Work with groups of shapes.
- Work with multiple pages.

Subsequent chapters focus on creating specific types of drawings, network directory services diagrams, Web site maps, UML diagrams, and database model diagrams.

Topics in this chapter

<i>The big picture</i>	<i>20</i>
<i>Creating a diagram</i>	<i>22</i>
<i>Adding and changing text</i>	<i>29</i>
<i>Grouping shapes in your diagrams.....</i>	<i>31</i>
<i>Working with pages</i>	<i>33</i>
<i>Enhancing your diagram</i>	<i>35</i>
<i>Saving and printing your work</i>	<i>36</i>

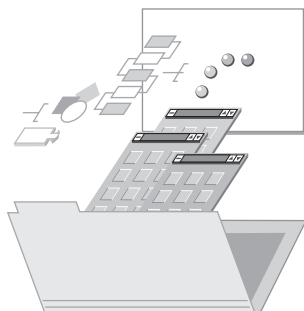
The big picture

The Visio 2000 products share a core set of features. This means that you can use common methods to work with all of the Visio 2000 programs to create your diagrams—whether they are business diagrams you create with Standard Edition, such as flowcharts or block diagrams; technical diagrams you create with Technical Edition, such as P&IDs or electrical schematics; or design and modeling diagrams

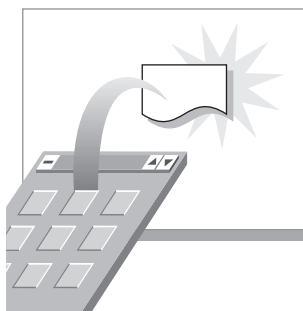
you create with Professional Edition or Enterprise Edition, such as Web site schematics or object role modeling diagrams.

The illustration below shows five steps all Visio 2000 diagrams have in common. The following page shows the actual workspace you'll use to create Visio diagrams.

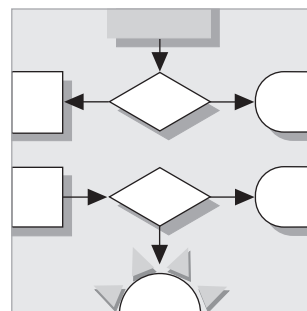
Five steps to making a Visio diagram



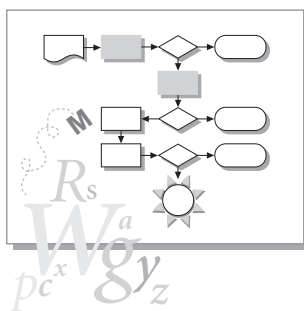
1 Start a diagram by opening a drawing type, or template.



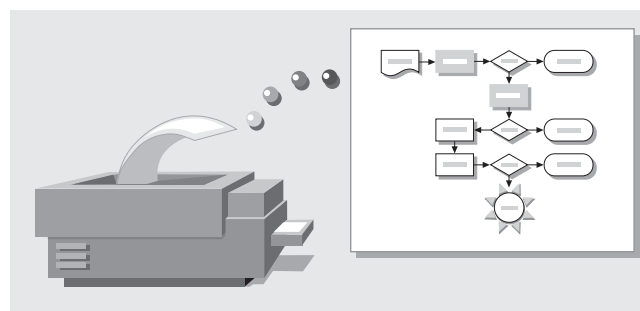
2 Add shapes by dragging them from the stencil and dropping them onto the drawing page.



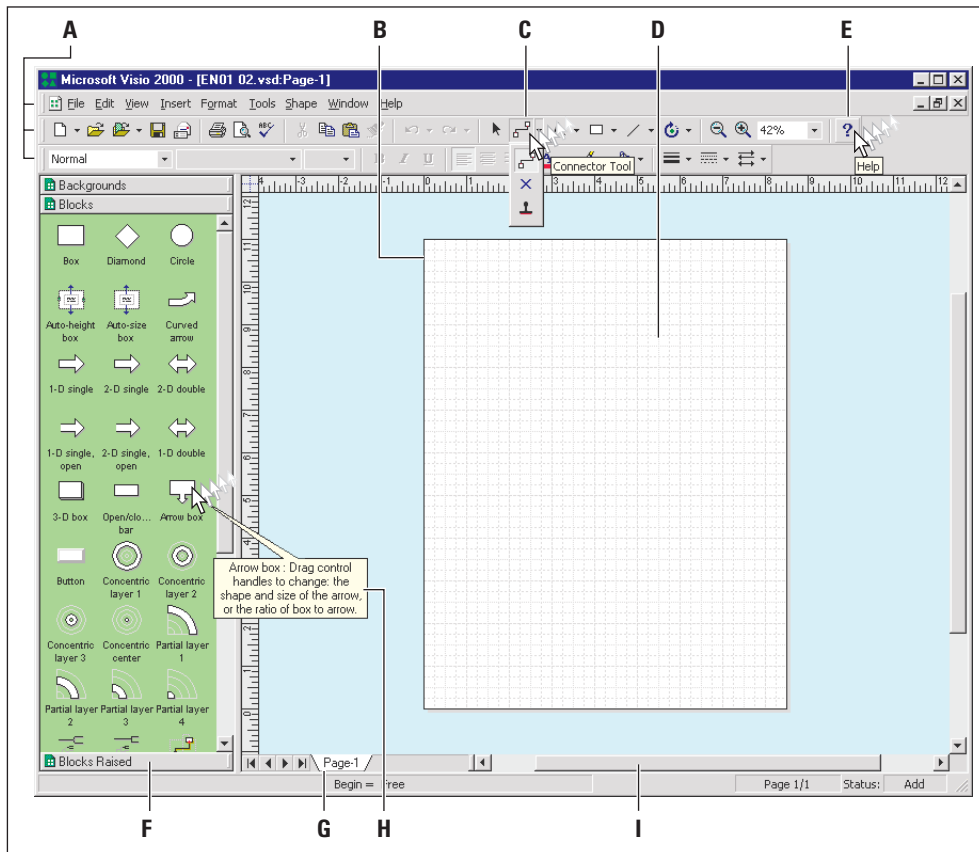
3 Connect the shapes in your diagram.



4 Add text to shapes in your diagram, and add independent text for titles.



5 Publish your diagram to the Web, or print your diagram to share it with others.



The Visio 2000 workspace

Each drawing type opens with stencils, shapes, and toolbars appropriate to that drawing type.

- A** Tools are grouped in functional sets on toolbars. You can specify which toolbars you want to display by choosing View > Toolbars.
- B** The drawing page opens with size, orientation, scale, grid, and measurements appropriate for the drawing type.
- C** You can find additional related tools by clicking the arrows next to the buttons.
- D** You can use the drawing page grid to align shapes to each other.
- E** ScreenTips appear when you pause the mouse pointer over a toolbar button.
- F** Stencils, or collections of masters, dock to the left of the drawing page, by default.
- G** With page tabs you can quickly insert new pages, navigate multiple-page diagrams, delete pages, rename pages, and reorder pages.
- H** Masters are shapes you can add to your diagrams. To quickly view information about a shape, pause the mouse pointer over the shape.
- I** When your diagram has multiple pages, you can move the horizontal scroll bar to view all of the page tabs.

Creating a diagram



To locate a specific shape quickly, use the Shape Explorer™ to find it. Choose Tools > Macros > Shape Explorer.

When you base a diagram on a Visio drawing type (also called a template) in Visio 2000, you automatically get all the tools and features you need to create that particular type of diagram.

For example, to create an organization chart, you open the Organization Chart drawing type.

To start an organization chart

- 1 Start Visio 2000. In the Welcome To Visio 2000 dialog box, click OK.
 - 2 In the Choose Drawing Type dialog box, click Organization Chart.
- You can see a preview of the drawing types in the Drawing Type box.
- 3 In the Drawing Type box, double-click Organization Chart.

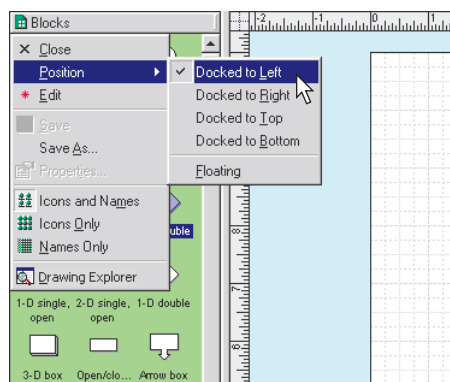
A drawing page appears, with the stencils and tools you need to begin your diagram.

Working with stencils

When you start a new diagram by opening a template, Visio 2000 opens one or more task-related stencils. Stencils contain shapes you can drag onto the drawing page to create your diagram. You can arrange, resize, and connect the shapes in your diagram to create the diagram you want.

To move stencils within the Visio window

- 1 Click the icon () on the stencil title bar. A menu appears.
- 2 Choose Position, and then choose the stencil placement you want from the submenu.



You can dock or “float”—make movable—stencils as you work on your diagram.

TIP For quick access to stencil menu commands use the Stencil toolbar. Choose View > Toolbars > Stencil.

To open additional stencils

- Choose File > Stencils > Open Stencil, choose the stencil you want to open, and then click OK.

Adding shapes to your diagram

The easiest way to create a diagram is to drag shapes from a stencil onto the drawing page. When you drop a shape onto the drawing page, Visio 2000 snaps the shape to the nearest grid line so you can position it precisely in your diagram.

TIP You can use a dynamic grid (dashed lines) to indicate the location for the center of the next shape you drag onto the page, based on the location of shapes already on the page. Choose **Tools > Snap & Glue**, and then check **Dynamic Grid**.

To add a shape to your diagram

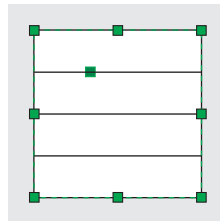
- 1 Choose the pointer tool (☞) from the Standard toolbar, located just below the menu bar.
- 2 In the stencil, select the shape you want.
- 3 Hold down the left mouse button and drag the shape onto the drawing page.
- 4 Release the mouse button to drop the shape onto the drawing page.

NOTE If you make a mistake, you can use the **Undo** toolbar button (↶) to cancel your most recent actions, and the **Redo** button (↷) if you change your mind.

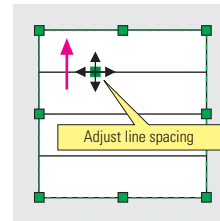
Using shape handles

Visio shapes have handles you can use to resize or move the shape, or to change the shape's appearance, position, or behavior. You use selection handles (■) to resize shapes, and control handles (■) to perform actions that are unique to the particular shapes on which they appear.

For example, you might use a control handle to adjust the position of a shape or move a line in a shape. To display a ScreenTip about what the control handle does, pause the mouse pointer over the control handle.



The control handle looks just like a selection handle, but has darker shading.



To see a ScreenTip for what a control handle does, pause the pointer over the control handle.



For details, use these online Help keywords:

- Shape basics
- Guides and guide points
- Handles



To nudge a shape slightly in one direction, select the shape, and then click the up, down, left, or right arrow key.

Moving and resizing shapes

Moving Visio shapes is as easy as selecting the shapes and then dragging the selection to the new location in your diagram. You can resize shapes quickly by simply dragging selection handles.

To move or resize a shape

- 1 To move the shape, select the shape with the pointer tool () , hold the left mouse button while dragging the shape to the location you want in your diagram, and then release.

The pointer turns white when the shape is movable.

- 2 To resize a selected shape, point to a selection handle () until the pointer changes to a four-headed arrow () , and then drag the handle to change the size.

To move multiple shapes

- 1 Click to select a shape, hold down the Shift key, and then click the other shapes you want to select.
- 2 Move the pointer over one of the shapes until the pointer turns white.

The shape is movable when the pointer changes from a black arrow to a white arrow.

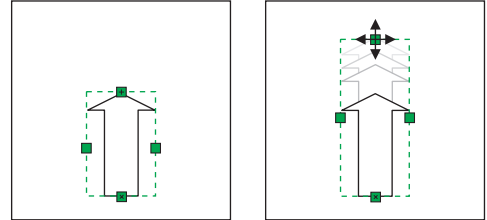
- 3 Drag the shape to its new position.

All selected shapes move, and retain their original spatial relationship.

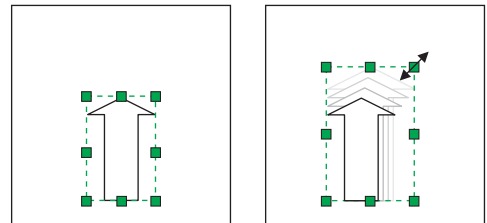
TIP *To limit the movement of shapes to horizontal or vertical, hold the Shift key while dragging.*

Using 1-D and 2-D shapes

Visio shapes can be one-dimensional (1-D) or two-dimensional (2-D).



1-D shapes behave like lines and display endpoints you can drag to resize the shapes when you select them with the pointer tool.



2-D shapes have corner handles you can drag to resize the shapes proportionally, and side selection handles you can drag to resize them horizontally or vertically.

Connecting shapes

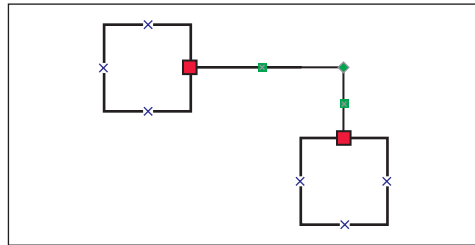
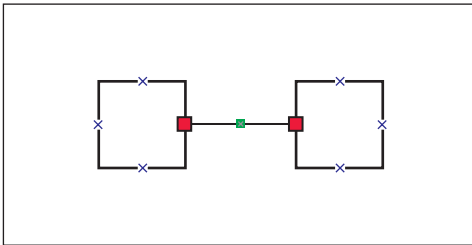
Flowcharts, organization charts, block diagrams, and network diagrams are all connected diagrams—diagrams that show relationships between shapes.

In a Visio connected diagram, a connector is any 1-D shape that connects 2-D shapes. Connected shapes stay connected when one of the shapes is moved. When you attach a connector to a connection point (✕) on a shape or to the shape itself, you glue the connector to the shape.

You can use two types of connections in Visio 2000, shape-to-shape and point-to-point. The type of connection you use depends on how much control you want over your diagram.

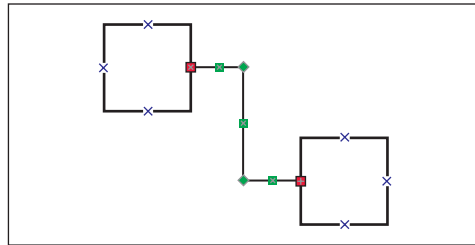
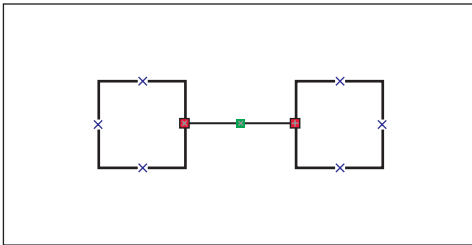
With shape-to-shape connections, Visio 2000 maintains the most direct connection between the shapes. This means that the actual points of connection might change when you move the connected shapes in relation to each other.

With point-to-point connections, the actual points of connection stay the same no matter how you move the connected shapes.



Shape-to-shape connections

When you move shapes that have shape-to-shape connections, the connector attaches at the closest points between the shapes, which might be different from the original connection points.



Point-to-point connections

When you move shapes that have point-to-point connections, no matter how you arrange the shapes in relation to each other on the drawing page, the shapes maintain their original connection points.

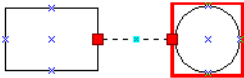
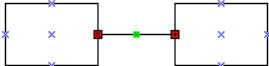
To connect shapes automatically, shape-to-shape

- 1 Click the connector tool () on the Standard toolbar.
 - 2 Drag a shape from a stencil onto the drawing page.
 - 3 While the shape is still selected, drag another shape from a stencil onto the drawing page.
- The shapes are automatically connected shape-to-shape.

To connect shapes on the drawing page, shape-to-shape

- 1 Use the pointer tool () to drag two shapes, one at a time, from a stencil onto the drawing page.
 - 2 From the Standard toolbar, click the connector tool (), and then position the connector tool over the center of the first shape until a red box appears around the entire shape. Hold down the mouse button and drag to draw a connector.
 - 3 While holding the mouse button, position the connector tool over the center of the shape to which you want to connect until a red box appears around the entire shape, and then release the mouse button.
- The shapes are connected shape-to-shape.

Using connections

Connection type	When to use it	How
Shape-to-shape 	To connect shapes when their specific points of connection don't matter.	Click the connector tool (), and then drag shapes you want to connect onto the drawing page. The shapes are connected shape-to-shape by default.
Point-to-point 	To control where the connector attaches to the 2-D shape.	Drag a connector shape onto the drawing page, and then drag the endpoint of the connector shape to the point on the 2-D shape to which you want to connect.

To connect shapes point-to-point

- 1 Use the pointer tool to drag two shapes, one at a time, from a stencil onto the drawing page.
- 2 From the Standard toolbar, click the connector tool, and then drag from the connection point on the first shape to a connection point on the second shape.

The connection points turn red, and the shapes are connected point-to-point.

To add a connection point to a shape

- 1 Click the arrow next to the connector tool on the Standard toolbar, and then click the connection point tool (✕).
- 2 Hold down the Ctrl key, and then click the shape where you want to add the connection point.

The new connection point appears (in magenta) on the shape.

To change a connection point from shape-to-shape to point-to-point

- Drag a red (glued) connector endpoint (■) away from the shape and then back to one of the shape's connection points.

When you drag the endpoint back to the shape, a box appears only around the connector endpoint.

Modifying shapes

You can use Visio tools to flip and rotate shapes in your diagrams, as well as to add color and change line styles.

You can use Visio tools on the Action toolbar to modify shapes.

To view the Action toolbar

- Choose View > Toolbars > Action.

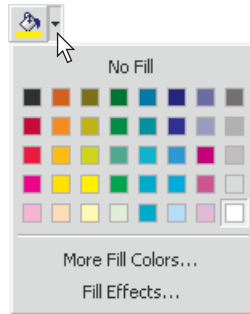
Flip and rotate shapes with Action tools

Action	Tool
Flip a shape horizontally	
Flip a shape vertically	
Rotate a shape right	
Rotate a shape left	

You can add color and shadows to shapes and instantly make your diagrams more visually dynamic. You can also change the format of lines and line ends in your diagrams. By applying line ends, you can turn any line into an arrow.

To view the fill color palette

- Click the arrow next to the Fill Color button on the Format toolbar.



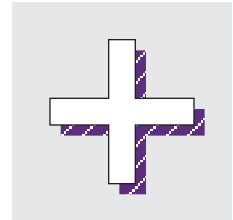
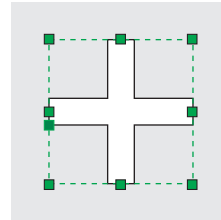
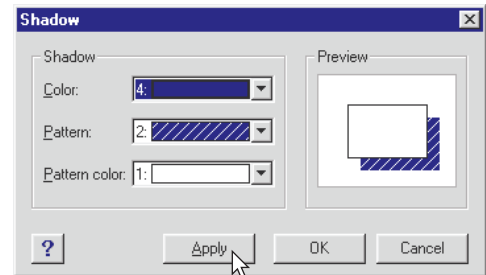
The fill color palette. Click More Fill Colors for additional colors.

To apply color to a shape

- Select the shape and choose the fill color you want to use from the fill color palette on the Format toolbar.

To apply or remove a shadow

- 1 Select the shape.
- 2 Choose Format > Shadow.
- 3 In the Shadow dialog box, choose the options you want to apply from the Color, Pattern, and Pattern Color lists.
- 4 Click Apply to view the options you chose before closing the dialog box, or click OK to apply the formatting and close the dialog box.
- 5 To remove a shadow, choose None from the Pattern list in the Shadow dialog box.



Use the Shadow dialog box to add, change, or delete shadows for shapes in your diagrams.

To format a line style

- Select the shape and choose the Line Weight, Line Pattern, and Line Ends buttons on the Format toolbar to select the formatting you want to use.

For details about diagramming your own shapes, see Chapter 12, “Go further: creating shapes, styles, and templates.”

Adding and changing text

Text can clarify the meaning of your Visio diagrams, and you can use text to document changes you or other Visio users make to a diagram. You can use text to

- Describe the process a shape represents in a process flow diagram.
- Add title blocks and bulleted lists to your diagrams.
- Annotate a diagram.

Most Visio shapes, including connectors, are designed so that you can add text to them. You can also edit the text in a shape by double-clicking the shape, and then editing the text block.

In addition, you can create text-only shapes—shapes that have no lines or fill—to add notes, titles, and lists to a diagram.

NOTE *Text for some shapes, such as the Wall shape in the Office Layout template, is generated automatically from data in the shape's custom properties. Also, some shapes, such as the Switch shape (also in the Office Layout template), are locked against adding text. The Visio program displays a message letting you know that text cannot be added to locked shapes.*

To add text to a shape

- 1 Select the shape, and then type the text you want.
- 2 When you finish typing, press the Esc key or click outside the shape.

TIP *To quickly select text in shapes, double-click the shape. You can change the default behavior for the double-click action by choosing Format > Behavior. Click the Double-Click tab, and then select the option you want.*

To delete text from a shape

- 1 Choose the text tool (**A**) from the Standard toolbar, located just below the menu bar.
- 2 Click the shape containing the text you want to delete.
- 3 Select the text you want to delete, and then press the Delete key.
- 4 Click outside the text block to close it.

To edit existing text

- 1 Double-click the shape to open the shape's text block, and then type. You can also click the text tool (**A**) on the Standard toolbar, click the text, and then type.
- 2 Click in the text block where you want to place the insertion point, and then type the text you want.
- 3 When you finish typing, click outside the shape.



For details, use these online Help keywords:

- Text and text blocks



To find and change text in large diagrams, use the Find And Replace dialog box. Choose Edit > Replace, and then type the replacement text.

To format text, do one of the following

- Use the commands on the Format menu or the tools on the Format toolbar to apply formatting to the selected text.
- Use the Text style lists on the Format toolbar to apply a style to the selected text.

To create a text-only shape

- 1 From the Standard toolbar, click the text tool (A).
 - 2 Click the drawing page where you want the text to begin, and then type.
- Or, drag the mouse until the text block is the size you want, release the mouse button, and then type.
- 3 When you finish typing, press the Esc key or click outside the text block.

Using the text ruler

You can turn on the text ruler to help you format text in a shape as you edit it. The ruler shows the initial settings for the indents and tab stops of the selected paragraph.

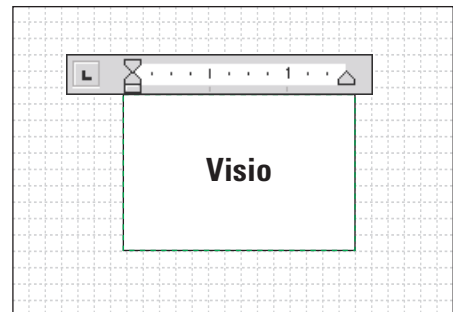
You can quickly change the settings for the selected text by dragging the tab stops and indent markers to the location on the scale you want in the text edit window.

To turn on the text ruler

- 1 Double-click a shape to open the shape's text block, or click the text using the text tool (A) on the Standard toolbar.
- 2 Right-click the shape with its text block selected, and then choose Text Ruler from the shortcut menu.

The text ruler appears above the shape.

The text ruler appears for all subsequent shapes when you edit their text. To turn off the text ruler, right-click the shape in text-edit mode, and then choose Text Ruler.



The text ruler appears directly above the text edit window.

Grouping shapes in your diagrams

You can group shapes so they function as a unit. It is useful to group shapes when you regularly use them together. For example, when you create an office layout, you can group office shapes with cubicles, and then you can duplicate the group and use it over and over again or move it easily to a different location in your diagram.

Creating groups of shapes

You can group any combination of Visio shapes, including those you draw yourself, other groups, and shapes from other programs. After you create a group, you can add and delete shapes from the group.

To create a group

- 1 Drag the shapes you want to group, one at a time, from a stencil onto the drawing page.
- 2 Select the first shape, hold down the Shift key, and then click to select the other shapes one at a time.
- 3 Choose Shape > Grouping > Group.

Modifying groups and shapes in groups

You can modify groups just as you would any individual shape. You can select, move, resize, or rotate a group as a single shape, but its members retain their original appearance and properties.

You can also select and modify the individual shapes that make up the group.

To select a group of shapes

- Click one of the shapes in the group.
A dashed line appears around the grouped shapes.

NOTE The pointer tool turns from black (☛) to white (☞) when positioned over an individual shape in a group.



For details, use these online Help keywords:

- Groups
- Shapes

To select an individual shape in a group

- 1 Select the group by clicking a shape with the pointer tool.
- 2 Click the shape you want to modify in the group.

 Make any changes you want to the shape, and then click anywhere outside the shape.

The following table provides a quick summary of how you can work with shapes and groups of shapes.

Methods for working with groups

To	Do this
Group shapes	Select the shapes you want to group, and then choose Shape > Grouping > Group.
Ungroup shapes	Select the group, and then choose Shape > Grouping > Ungroup.
Modify individual shapes in a group	Select the group, and then click the shape you want to modify.
Delete a shape from a group	Select the group, click the shape you want to delete, and then press the Delete key.
Add a shape to a group	Select the group. Shift+click any other shapes you want to add to the group, and then choose Shape > Grouping > Add To Group.
Move a group	Select the group, and then drag it to the location you want.

Working with pages

For some diagram projects, you might want your drawing file to contain many drawing pages. For example, a file could represent a management project with a high-level timeline for the project on one drawing page, a flowchart of the processes in the project on another page, and the plan for staffing and resources on another page. You can change the orientation and size of your page using the Page Setup dialog box.

You can also add, delete, rename, and reorder pages easily using the page tab controls located at the bottom of the drawing window.

Setting page orientation

If you want to change drawing page settings, such as orientation or size, as you create your diagram, you can use the Page Setup dialog box to verify that your printer page settings work with the new drawing page settings you specified.

To set page orientation

- 1 Display the drawing page you want to change, and then choose File > Page Setup.
- 2 In the Page Setup dialog box, click the Page Size tab, and then select the page orientation you want.

To set printed page orientation

- 1 Display the drawing page you want to change, and then choose File > Page Setup.
- 2 On the Print Setup tab, choose the paper orientation you want (Portrait or Landscape), and then click OK.

Adding and deleting drawing pages

When you add a new drawing page to your diagram, the new page inherits the size, orientation, scale, measurement unit, shadow offset, and grid settings of the page currently displayed.

You can change these settings using the Page Setup dialog box when you insert the page, or at any time.

You can also delete pages you no longer use. If you delete the last page in a file, Visio replaces that page with a blank page.

TIP To view all the page tabs for multiple-page diagrams, you might have to move the horizontal scroll bar. Pause the cursor over the slider box (■) until it changes to a two-headed arrow, and then drag it to the right. You can also click the scroll arrows to the left of the page tabs.



For details, use these online Help keywords:

- Pages
- Drawing scales
- Background pages



To quickly resize your drawing page, hold down the Ctrl key and use the pointer tool to drag the edge of the drawing page to the size you want.

To add a drawing page

- 1 Right-click the page tab at the bottom of the drawing page window, and then choose Insert Page from the shortcut menu.
- 2 In the Page Setup dialog box, click the Page Properties tab, and then type a name for the page, or use the default name.

You can also double-click the page tab, and then type, to quickly change the page name.

TIP Add a background page to your drawing file when you want the same shape(s) to appear on more than one drawing page, such as your company logo on all pages of a multiple-page diagram. For details about backgrounds, see “Using background pages to display common page elements” on page 147.

To delete a drawing page

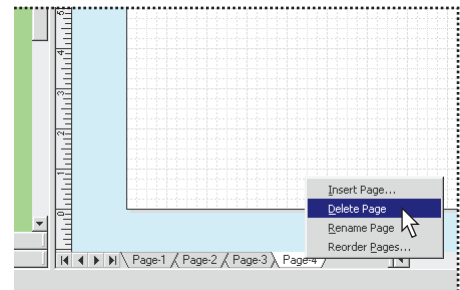
- Right-click the page tab, located at the bottom of the drawing page window, for the page you want to delete, and then choose Delete Page from the shortcut menu.

NOTE If you change your mind after you delete a page, you can click the Undo button (↶) on the Standard toolbar to retrieve it.

To navigate between pages

- Click the page tab at the bottom of the drawing window for the page to which you want to navigate.

If any of the page tabs are hidden, use the arrow buttons and scroll bar to display multiple page tabs.



Click page tabs to navigate between pages. Right-click page tabs to view page menu commands.

Resizing pages

Resizing pages enables you to enlarge a page where you need it and remove empty space you do not need, both without changing the drawing scale.

To resize a page

- 1 Choose File > Page Setup.

The Page Setup dialog box appears.

- 2 Click the Page Size tab, type the page dimensions you want under Custom Size, or select a page size option, such as Size To Fit Drawing Contents, and then click OK.

For details about page setup, see “Printing your diagrams” on page 134.

Enhancing your diagram

You can use color and style formats to make your diagram a more powerful communication tool, or simply to make it more aesthetically appealing.

You can use styles to modify the look of lines, colors, and text, and, in certain business diagrams, you can apply preformatted color schemes.

To apply a style

- 1 Open the diagram for which you want to apply a style.
- 2 Select one or more shapes you want to format.
- 3 Choose Format > Style, and then select the style you want from the lists. All the styles available in a diagram, both those pre-defined in a template and those you define yourself, are listed in the Style dialog box.

To apply a color scheme

- 1 Open the diagram for which you want to create a color scheme.
- 2 Choose Tools > Macros > Visio Extras > Color Schemes.
- 3 In the Color Schemes dialog box, select the color scheme you want to use, and then click OK.

For details about creating your own styles, see “Defining and editing styles” on page 146.



For details, use these online Help keywords:

- *Color schemes*
- *Styles*

Saving and printing your work

You should frequently save diagrams as you work. You should also be sure to save any stencil and template files that you change.

The first time you save a diagram, Visio 2000 prompts you for document properties, such as whether to save a preview, a small thumbnail version of the diagram. The properties you specify appear in the Open dialog box when you select the drawing file name.

You can print your diagrams by choosing a menu command or toolbar button.

To save a diagram for the first time

- 1 Choose File > Save or Save As.
- 2 For File Name, type a name for the drawing file.
- 3 Under Save In, open the folder in which you want to save the file.
- 4 Click Save.
- 5 In the Properties dialog box, enter the information you want, and then click OK.
- 6 Click Save.

To print your diagram, do one of the following

- Click the Print button () on the Standard toolbar.
- Choose File > Print.

For details about printing and delivering your diagrams, see Chapter 11, “Share your diagrams with others.”

Design and document your network

The Network Diagram solution in Microsoft® Visio® 2000, Professional Edition includes the templates and tools you need to create and manage physical and logical network diagrams. Using the Logical Network Diagram template to lay out your network, you can

- Use layers to identify and work with specific components in your diagrams. For example, you can quickly identify all computers made by a particular manufacturer.
- Store information associated with each shape so that you can troubleshoot problem areas, generate cost estimates, and perform quick inventories.
- View the manufacturer, product name, product description, and model number properties of network shapes, or create your own properties for tracking equipment and generating inventories or bills of materials.

Topics in this chapter

<i>Creating network diagrams.....</i>	<i>38</i>
<i>Managing network diagrams with layers</i>	<i>39</i>
<i>Laying out network shapes automatically</i>	<i>40</i>
<i>Creating and viewing network shape properties</i>	<i>40</i>

Creating network diagrams



To reposition text for most network shapes, you can drag a control handle (■) to a different location. If the control handle is not visible, right-click the shape and choose Show Text Control Handle.

You can use network diagrams to design and implement network configurations and visualize the complexity of an existing network. Troubleshooting your network's infrastructure then becomes easier because you have accurate and detailed information to refer to.

You can use named categories of shapes, called layers, to differentiate network components. You can also use custom properties and reports to store and report on data associated with your network shapes.

To create a basic network diagram

- 1 Start Visio 2000. In the Welcome To Visio 2000 dialog box, click OK.
- 2 In the Choose Drawing Type dialog box, click Network Diagram.
- 3 In the Drawing Type box, double-click Logical Network Diagram.

4 From the Logical Symbols stencil, drag an Ethernet, ring, bus, or other network shape onto the drawing page.

5 Drag workstation shapes and other shapes to the vicinity of the Ethernet, ring, bus, or other network shape.

6 Select the ring, bus, or Ethernet shape, and then place the pointer over a control handle. When the pointer changes to a four-headed arrow, drag it to a connection point (✕) on one of the surrounding shapes.

The control handle turns red, indicating that it's glued to the connection point.

7 Repeat step 6 as necessary to connect the shapes.

8 To add text to a network shape, select the shape, and then type.

Managing network diagrams with layers

When you create a network diagram using the Logical Network Diagram template, Visio 2000 places the network shapes on layers. For example, when you drag a Macintosh shape onto the drawing page, Visio 2000 adds the shape to a general Network layer.

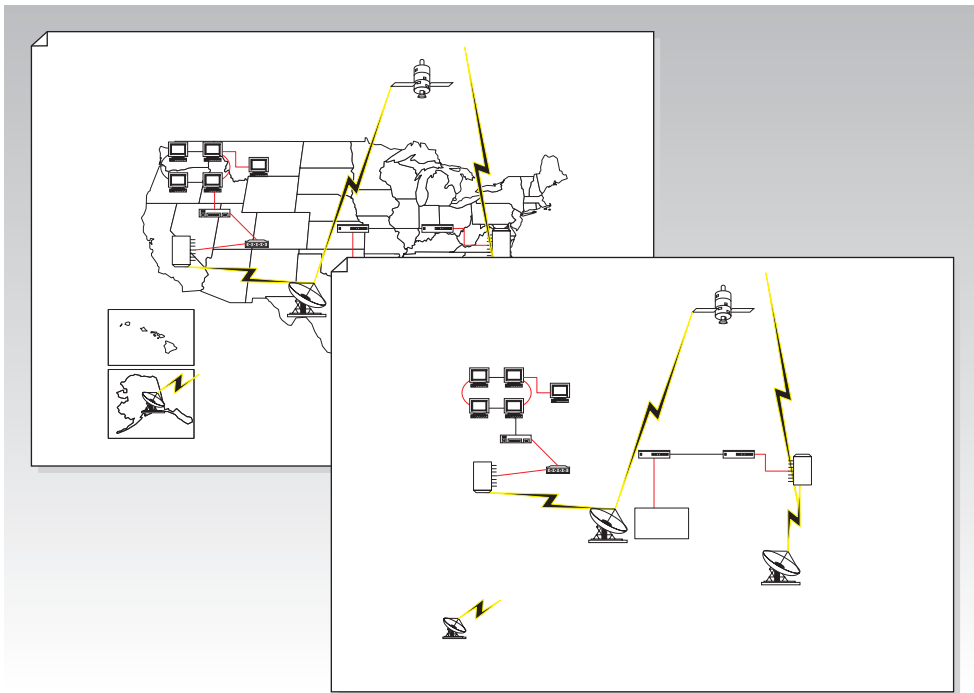
When shapes are assigned to separate layers, you can treat the shapes on each layer separately. For example, you can hide or lock all layers except the one you want to work on,

or you can print shapes based on their layer assignments. You can also generate numeric or inventory reports for shapes on particular layers.

To view only one layer in a drawing

- Choose View > Layer Properties.

Under Visible, uncheck all the layers except for the layer you want to view, and then click OK.



Using layers in drawings

Network shapes are automatically assigned to layers in drawings, so you can easily work with subsets of shapes.

Laying out network shapes automatically

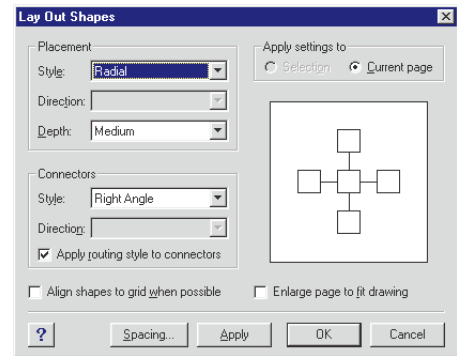
You can use the Lay Out Shapes command to have Visio 2000 position shapes in your network diagram automatically. Using automatic layout, you can revise your drawing faster than using the pointer tool to select and drag each network shape to a new location.

For example, if you're updating a large network diagram, you can add and connect new shapes, and then use the Lay Out Shapes command to lay out the updated drawing.

To lay out network shapes automatically

- 1 Open the network diagram you want to lay out.
- 2 Choose Tools > Lay Out Shapes.
- 3 In the Lay Out Shapes dialog box, under Placement, select the style, direction, and depth you want for your layout.

- 4 In the Connectors section, select the style and direction you want, and then click OK.
- 5 If you don't like the new layout, press Ctrl+Z to undo it, and then repeat steps 2 through 4 using a different setting.



Experiment with combinations of placement settings in the Lay Out Shapes dialog box. The preview shows you what to expect.

Creating and viewing network shape properties

Visio 2000 contains logical network shapes and generic manufacturer-specific shapes.

By default, Visio 2000 associates categories of data, known as custom properties, with each network shape. Custom properties contain information you can use to quickly identify network shapes. For example, the Generic Desktop shape has Manufacturer, Product

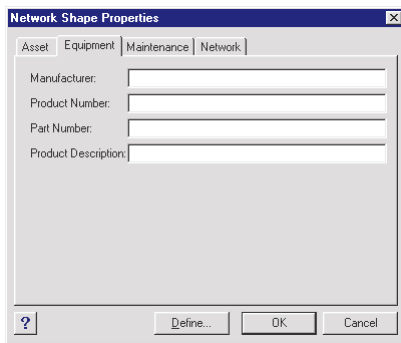
Number, Part Number, Product Description, Asset Number, Serial Number, Location, Building, Room, and Department properties, among others.

You can enter custom property data for a shape by right-clicking it, and then choosing Properties from the shortcut menu.

You can define additional custom properties for these shapes, and then use the properties to track equipment and generate reports, such as inventories, cost sheets, or bills of materials.

Your report can include all shapes or only the ones you select. You can select by layer to report on specific manufacturers or equipment types.

You can also define your own custom properties and tabs to display them for a shape. For details, see “Defining custom shape properties” on page 42.



The tabs in the Network Shape Properties dialog box correspond to categories of network equipment data. The tabs that appear depend on the shape you have selected and what custom properties are assigned to it.

To change the properties of a network shape

- 1 Right-click a shape, and then choose Properties from the shortcut menu.
- 2 Click the tab for the property category you want to change. The tabs that appear depend on the shape you selected.

Following are descriptions of the tabs and the property information each contains. Additional information might be displayed if you have defined custom properties and tabs for the selected shape.

Equipment Manufacturer, Product Number, Part Number, and Product Description

Asset Asset Number, Serial Number, Location, Building, Room, and Department

Maintenance Purchase Date, Cost, Warranty Exp., Installed Date, Support Agreement, Comments, Support Contact Name, and Contact Phone

Network Network Name, IP Address, Subnet Mask, Admin. Interface, Number Of Ports, MAC Address, Community String, and Network Description

Workstation Name, Operating System, Memory, Hard Drive Size, Quantity, Additional Devices, and MAC Address

Cables Cable Type, Cable Length, Cable Source, Cable Destination, and Drop Number

- 3 Make your changes, and then click OK.

To generate a report

- 1 Choose Tools > Property Report.
- 2 Follow the instructions in the Property Reporting Wizard to generate your report.



You can also choose Tools > Macros > Custom Properties Editor to define custom properties for shapes you specify. You do not have to switch to Developer Mode to use the Custom Properties Editor, but you cannot create new tabs for properties using this method.

Defining custom shape properties

You can define custom properties and create tabs to display that information using the Network Shape Properties dialog box. To do this, you switch to Developer Mode, define the property information you want, and assign a new tab. The tabs you create are displayed in the dialog box when you open it.

To switch to Developer Mode

- 1 Choose Tools > Options.
- 2 Click the Advanced tab and check Run In Developer Mode.
- 3 Click OK.

To add a custom property to a network shape and add a tab to display it

- 1 Drag a network shape onto the drawing page.
- 2 Right-click the shape, and then choose Properties from the shortcut menu.
- 3 Click Define.

The Define Custom Properties dialog box opens. The Properties list shows the properties that are already defined for the shape.

- 4 Click New, and then enter the label, name, type, format, value, and prompt for the new custom property.
- 5 For SortKey, enter the name of the tab on which you want the new property to be displayed.
- 6 Click OK.

The new property and tab now appear in the Network Shape Properties dialog box.

- 7 Click OK.

Label	Type	Format
Manufacturer	String	
Product Number	String	
Part Number	String	
Product Description	String	
Asset Number	String	
Serial Number	String	
Location	String	

Use the Define Custom Properties dialog box to create tabs for custom properties that appear in the Network Shape Properties dialog box.

NOTE You can also add custom properties to masters, or shapes on a stencil that you reuse again and again. Right-click the title bar of the stencil that contains the master to which you want to add a custom property and choose Edit. Right-click the master to which you want to add custom properties, choose Edit Master, and then follow steps 2 through 7 of the preceding procedure.

To exit Developer Mode

- 1 Choose Tools > Options.
- 2 On the Advanced tab, uncheck Run In Developer Mode.
- 3 Click OK.

Document directory services

The Microsoft® Visio® directory services solutions make it possible for you to design new directory services, create alternative designs for existing directories, or create a plan for updating or migrating your current network's directory service. You can plan and allocate current and future network resources, and design policies and guidelines for a network before the physical network is in place.

Using the Visio directory services solutions, you can

- Develop a plan for moving from one network domain to another.
- Physically design a network.
- Design policies and permissions.

Topics in this chapter

<i>Using the Visio directory services solutions.....</i>	<i>44</i>
<i>Using the Directory Navigator</i>	<i>45</i>
<i>Creating a directory diagram</i>	<i>46</i>
<i>Fine-tuning your diagram.....</i>	<i>52</i>

Using the Visio directory services solutions



The LDAP Directory solution supports Microsoft Exchange Server and Netscape Directory Server.

A directory service is a repository of information about network resources, such as hardware, software, users, or policies. Each resource is represented by an icon, called an object, which contains specific information about itself and about its relationship to other objects.

The Visio directory services solutions contain all the templates and objects you need for documenting and diagramming

- LDAP (Lightweight Directory Access Protocol), a general-purpose directory service.
- Microsoft Active Directory®.
- Novell Directory Services® (NDS®).

To open a Visio directory services solution

- 1** Start Microsoft Visio® 2000, Professional Edition. In the Welcome To Visio 2000 dialog box, click OK.
- 2** In the Choose Drawing Type dialog box, click Network Diagram.
- 3** Choose a template (.vst) for the directory service you want to document.
- 4** Click OK.

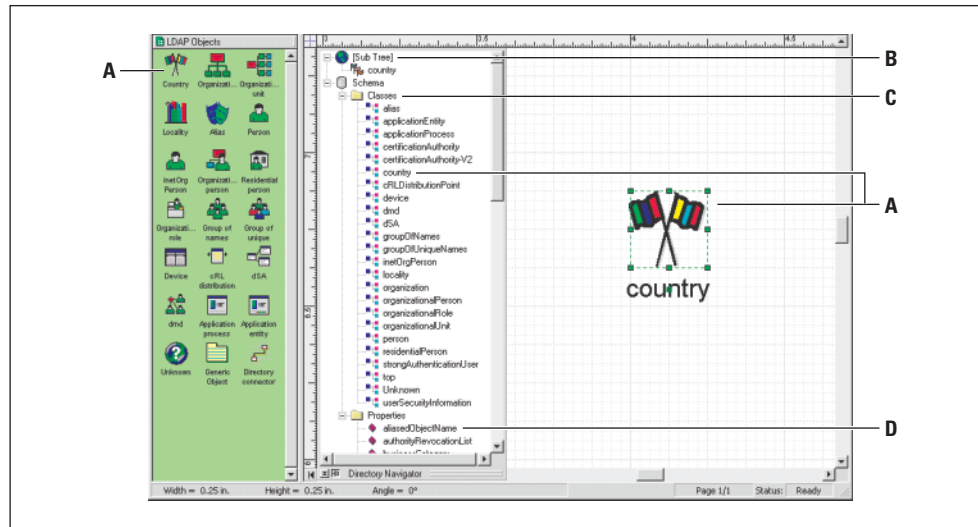
The solution you chose opens with a default schema of classes and properties for that service. These classes and properties represent the resources that allow you to document and diagram a network.

Using the Directory Navigator

A Visio directory services template opens with a new drawing page for diagramming the network, stencils of directory services shapes, and a separate window called the Directory Navigator.

The Directory Navigator schema lists the classes and properties you need to document and dia-

gram a network. Classes and properties vary according to the directory service schema. The [Sub Tree] level of the Directory Navigator displays the structure of the directory in a tree view as you add objects, also called views, to the directory diagram.



The Directory Navigator

- A** Classes and shapes dragged onto the directory diagram or added to the Directory Navigator become real-world objects for the diagram, where you add or change property values.
- B** The [Sub Tree] level represents the base of the directory structure. The structure of the directory is displayed here as you add objects to the Directory Navigator or to the directory diagram. There is only one [Sub Tree] in the Directory Navigator as all objects must link back to one [Sub Tree].
- C** Classes are used to identify objects, such as a person, printer, policy, or location, on the network. The classes displayed in the Directory Navigator are the default classes defined by a directory service.
- D** Properties are attributes that define a class. The properties displayed in the Directory Navigator are the default properties for that directory service. Properties assigned to a class can have values assigned to them.

Creating a directory diagram



Most shapes on the stencils have corresponding classes. If a shape does not have a corresponding class, you will be prompted to apply a base class to the shape when dragging it to the directory diagram.

After choosing a directory services solution, you can document and diagram the logical structure of a directory using existing shapes and classes, add objects to the directory diagram and assign values to the object's properties, or create custom properties and classes. Once objects are added to the Directory Navigator and to the directory diagram, you can easily move them to new locations to create new relationships with other objects.

Adding objects to a directory diagram

Use any of the following methods to add objects to a directory diagram and to add and modify an object's values.

When adding an object to the directory diagram, you can have only one object of a particular type with a given name.

To add an object by dragging a shape from the stencil

- Drag a shape from the stencil onto the directory diagram.

The shape is added to the directory diagram and also to the [Sub Tree] level of the Directory Navigator.

NOTE *Each object on a page of a diagram must have a unique name. If a diagram spans multiple pages, however, each page can contain that same object.*

To add an object by dragging a shape onto an existing object in the directory diagram

- Drag a shape from the stencil and drop it on top of an existing object in the directory diagram.

The shape automatically connects as a child to that parent object in the directory diagram with a Directory Connector (). The relationship is also added in the Directory Navigator.

IMPORTANT *If you drag a class or object onto another object, and the connection violates the parent-child relationship rules of the directory service with which you're working, a warning appears informing you that the connection is invalid. You can, however, continue with the connection.*

To add an object to the [Sub Tree] level by dragging a shape to the directory diagram

- Drag a shape from the stencil, but do not drop it onto any other objects on the directory diagram.

The shape is added to the diagram and is added as a child of the [Sub Tree] level in the Directory Navigator. It stays as a child of the [Sub Tree] level until it is manually connected to a parent shape with a Directory Connector ().

To add a view of an object to the directory diagram

- 1 Drag an existing object from the [Sub Tree] level of the Directory Navigator to the directory diagram.

NOTE *If the object already exists in the directory diagram, you will not be allowed to add it to that page. However, you can have the same object on different pages of the diagram.*

- 2 In the Add Shapes To Page dialog box, enter the number of existing child levels you want to add to the directory diagram, or select to add only the specified object to the directory diagram.

If you do not want to see this dialog box each time you drag objects from the Directory Navigator, click Don't Show This Dialog Box Again. You can reset this option by choosing Directory Services > Options, and then selecting a new On Shape Drop action. For a list of Visio directory services options you can set, see "To change default behavior options" on page 52.

- 3 Continue to add views of objects to the directory diagram.

To add an object to the directory diagram using the Directory Services menu

- 1 Select an object in the directory diagram.
- 2 Choose Directory Services > Add Entries.
- 3 In the Add Entries dialog box, select the type of class you want to add as a child to the selected object.

Only valid parent-child combinations of objects are allowed. You can add only classes that are valid child classes for the selected object.
- 4 Enter the number of entries of the selected class that you want to add to the selected object.

- 5 *Optional* Assign each class a name.

For details about assigning and changing object names, see "Moving objects" on page 49.

- 6 Click OK.

The object is added to directory diagram and also to the Directory Navigator.

- 7 Continue to add objects to the directory diagram until your diagram is finished.



Use a semicolon (;) to separate multiple values. Do not use any spaces between the semicolon (;) and the values.

To add an object to the Directory Navigator using the shortcut menu

- 1 Right-click an object in the Directory Navigator and choose Add Entries from the shortcut menu.
- 2 In the Add Entries dialog box, select the type of class you want to add as a child to the selected object.
Only valid parent-child combinations of objects are allowed. You can add only classes that are valid child classes for that object.
- 3 Enter a number that represents how many of the selected class type you want to add to the selected object.
- 4 *Optional* Assign each class a name.
For details about assigning and changing object names, see “Changing object names” on page 49.
- 5 Click OK.
The object is added as a child to the selected object in the Directory Navigator.

To modify an object by adding values and extended properties

- 1 Right-click an object in the diagram or in the Directory Navigator, and then choose Edit Properties from the shortcut menu.
The Edit Properties dialog box opens with the mandatory properties displayed for the object. The object’s Qualified Name appears at the top of the dialog box.
- 2 Check Show Optional Properties to show the optional properties for the object.
- 3 In the Value field, enter a value for each property to which you want to assign a value.
- 4 Check Show Extended Properties to show the extended properties for this object.
- 5 Click Add to assign another extended property.
- 6 In the Add Property dialog box, select the property you want to add and click OK.
The new property is added to the object as an extended property.

NOTE Data validation is not performed on values entered for a property.

Changing object names

The object name that appears by default in the Directory Navigator and in the diagram is the Unqualified Name. This name is determined by the naming properties set for the class and the values entered for the object. For details about classes, see “To create a custom class” on page 51.

To change an object’s name

- 1 Select an object in the Directory Navigator or in the directory diagram.
- 2 Choose Directory Services > Edit Properties.
- 3 Enter the new values for the naming properties, and then click OK.

The name is automatically changed in both the Directory Navigator and in the diagram.

Moving objects

You can reposition objects in your diagram or in the Directory Navigator by moving them to new parent objects.

To move an object to a new location in the directory diagram

- Drag an object from its current location to a new parent container in the directory diagram.

The object and all its child levels move to the new parent in both the Directory Navigator and in the diagram.

To move an object to a new location in the Directory Navigator

- Drag an object from one parent to another in the Directory Navigator.

The object and all its child levels move to the new parent in the Directory Navigator.

NOTE *If the child object exists in the directory diagram, but the new parent does not, the child will not move in the diagram. The Directory Connector between it and its original parent is deleted. If the new parent object exists in the directory diagram, the child object and any of its child levels move to the new parent.*



The Unqualified Name displays only the values of the class naming properties; the Qualified Name shows the naming properties and values for the object.

Deleting objects

You can delete objects from both the Directory Navigator and from the directory diagram. Objects deleted from the Directory Navigator also are deleted from the directory diagram along with any subsequent child levels. Deleted objects are removed from the schema and can no longer be used. Objects deleted from the diagram are not deleted from the Directory Navigator. This allows you to remove the current representation of the object from the diagram, but still allows the object to be added from the Directory Navigator to the diagram at a later time.

To delete an object from the directory diagram

- In the directory diagram, click the object you want to delete, and then press the Delete key.

To delete an object from the Directory Navigator

- Right-click the object you want to delete in the Directory Navigator, and then choose Delete Entry from the shortcut menu.

The object is deleted from the Directory Navigator. If the object exists in the directory diagram, it is also deleted there.

Creating custom properties and classes

In addition to the directory service's schema classes and properties, you can create custom properties and classes for that directory service. These custom classes and properties are available only in your currently open schema. They will not be accessible if you open another

instance of the same directory service solution. The classes and properties will, however, be saved when you save the directory diagram so that they are available the next time you open the diagram.

To create a custom property

- 1 In the Directory Navigator, expand the Schema icon.
- 2 Right-click the Properties folder, and then choose Add Property Class from the shortcut menu.
- 3 In the Edit Property Definition dialog box, fill in the following fields.

Property Name Assign a unique name for this property. Property names must be unique.

Property Identifier *Optional* Enter a unique number that identifies this property.

Syntax Select the syntax that indicates how a value entered for this property should be formatted. For details about adding values, see "To modify an object by adding values and extended properties" on page 48.

Maximum Size Enter a number that indicates the length of the string for the value.

Allow Multiple Values Select if you want to allow multiple values for the property.

- 4 Click OK.

The property is added to the Properties folder of the currently open directory service.

After creating a custom property, you can create a new class and add that property to the class.

To create a custom class

- 1 In the Directory Navigator, expand the Schema icon.
- 2 Right-click the Classes folder and choose Add Entry Class from the shortcut menu.
- 3 On the Identity tab, fill in the following fields.

Class Name Assign a unique name to this class.

Class Identifier *Optional* Assign a unique number that identifies this class.

Naming Properties Click to add naming properties that identify the class. Naming properties define how the name of the object is displayed in the Directory Navigator and in the diagram.

For example, if you set the naming properties of a class to include CN (Common Name), the user object will display the CN value in the Directory Navigator and in the directory diagram.

- 4 On the Properties tab, click Add to assign mandatory and optional properties for the class. The list of properties is obtained from the schema.

Mandatory properties These properties cannot be deleted after they are defined for a class. They can contain no null values, but may contain multiple values. For example, if a User object has CN (Common Name) as a mandatory property, you must indicate at least one user name for its value. The property itself cannot be deleted from the object,

while the value for the property can be changed.

Optional properties These properties cannot be deleted after they are defined for a class; however, they can contain null values. For example, if the User object has Telephone as an optional property, the object may exist on the directory diagram but have no value assigned to it.

- 5 On the Advanced tab, fill in the following fields.

Superclass *Optional* Select a class from which this new class inherits its properties.

Description *Optional* Describe why the new class inherits properties from the selected superclass.

Auxiliary Superclass *Optional* Add classes from which this new class inherits properties.

Virtual/Abstract Select if the class can be used only as a superclass for another class.

Container Select if the class is considered a container class, or a class that can have child entries. If a class is not indicated as a container class, you will still be allowed to add child entries to it in your diagram.

Extensible Select if the class is allowed to have extensible properties.

- 6 Click OK.

The class is added to the Classes folder of the currently open directory service.

Fine-tuning your diagram

Using the Directory Services menu you can set your default behavior options, set options for laying out shapes, and change layout spacing.

To change default behavior options

- 1 Choose Directory Services > Options.
- 2 In the Directory Services Options dialog box, set the following options.

Show Tree View Hides or displays the Directory Navigator.

Show Qualified Names Displays the Qualified Name in the Properties dialog box. The Qualified Name format is dependent upon the directory service.

Enable Auto Layout Automatically lays out parent and child levels when they are dragged to the directory diagram.

Prompt To Add Child Views Prompts you to add a number of child levels to the diagram when dragging an object from the Directory Navigator to the directory diagram.

Prompt To Delete All Instances Prompts you to delete all instances of an object and any child levels from both the diagram and the Directory Navigator.

To change the default layout style for objects

- 1 Select the parent shape for which you want to change the layout.
- 2 Choose Directory Services > Lay Out Children.
- 3 Select the layout style for the diagram.

To show or hide child objects

- 1 Select the parent shape for which you want to show or hide the child objects.
- 2 Choose Directory Services > Hide Children to hide all child levels and objects for the selected parent, or choose Directory Services > Show Children to display any hidden child levels for the selected parent.

To change a shape's location within a diagram

- Select the object in the directory diagram, and then choose Directory Services > Move Shape Left/Up or Move Shape Right/Down.

The selected object is exchanged with an adjacent object (left, right, above, or below). Any child levels will move in the exchange.

NOTE *If you move an object to a location where it will share a parent with another object of the same class, and which also has the same name as the moved object, a warning message appears indicating that you cannot have two like objects with the same name. You must change the name of one of the objects.*

Plan and map Web sites

Using Microsoft® Visio® 2000, Professional Edition, you can create diagrams that help you plan new intranet or Web sites and troubleshoot, reorganize, and expand existing sites.

With Visio 2000, you can

- Create high-level, conceptual diagrams of new Web sites to stimulate discussion of the sites' purpose, content, and overall organization.
- Generate maps of existing Web sites to analyze the sites' organization and classify their content.
- Troubleshoot existing intranet or Web sites by viewing broken links, and the types of errors that caused them, in the site maps and log files.

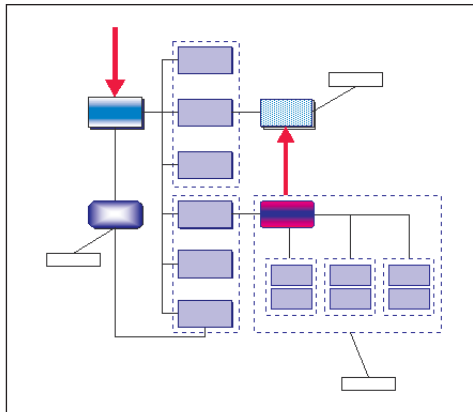
Topics in this chapter

<i>Planning a new Web site</i>	<i>54</i>
<i>Mapping and troubleshooting an existing Web site</i>	<i>56</i>

Planning a new Web site

A well-organized Web site begins with a plan. The first step in this plan is to brainstorm about the site content and how users might navigate the site.

With the shapes on the Conceptual Web Site Shapes and Web Site Map Shapes stencils, you can facilitate the brainstorming process by creating a high-level, conceptual diagram of your Web site. Use this diagram to visualize and experiment with the site's navigation patterns. You can easily revise these patterns by moving connected shapes around the page—the shapes stay connected as you drag.



Begin in Visio 2000 by dragging a Main Page shape onto the drawing page, and then work your way down from there, dragging more shapes onto the drawing page and connecting them as you go to create navigation patterns.

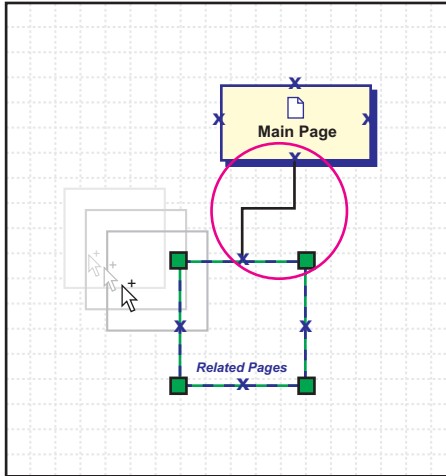
To create a diagram of a new Web site

- 1 Start Visio 2000. In the Welcome To Visio 2000 dialog box, click OK.
- 2 In the Choose Drawing Type dialog box, click Internet Diagram.
- 3 In the Drawing Type box, double-click Conceptual Web Site.
- 4 Click the connector tool () on the Standard toolbar.
- 5 Drag the Main Page shape onto the drawing page from the Conceptual Web Site Shapes stencil.

TIP To determine the purpose of a shape or how to use it, pause the pointer over a shape on a stencil. A tip is displayed for the shape.

- 6 With the Main Page shape selected, drag another shape onto the drawing page.

The shapes connect. Continue dragging shapes onto the drawing page from the Conceptual Web Site Shapes and Web Site Map Shapes stencils until you've completed your diagram.



When you use the connector tool to drag shapes onto the drawing page, each new shape connects to the currently selected shape.

- 7 Add text to a shape by selecting it, and then typing.
- 8 *Optional* Drag a Legend shape onto the drawing page from the Conceptual Web Site Shapes stencil.

You might want to add details to a shape that represents a particular HTML page or remote site by annotating it with callouts. You can also add a description to a shape, so that anyone can view it in the Custom Properties window.

To annotate your diagram with callouts

- 1 Drag a callout shape from the Callouts stencil onto the drawing page, and then type to add text.
- 2 Connect the callout shape to the shape it is annotating by dragging the endpoint (■) of the callout shape to a connection point (x) on a Web Site shape.

When you move the Web Site shape, the callout stays connected. You can reposition the text portion of the callout by dragging it.

To add a description to a shape

- 1 Choose View > Windows > Custom Properties to open the Custom Properties window.
- 2 Select the shape to which you want to add the description.
- 3 In the Custom Properties window, next to the Description box, type the description.

Distribute your Web diagram by printing it and giving it to the members of the Web team to review. You also can copy the entire diagram and paste it, for example, into a Web proposal in a Microsoft Word document. Choose View > Full Screen to electronically show the diagram during a meeting. Or publish it to your company's intranet.



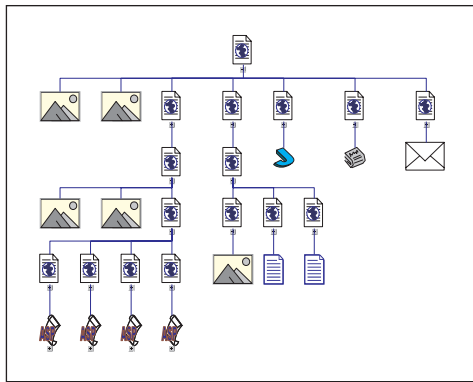
For details, use these online Help keywords:

- Internet Diagram
- Connecting shapes
- HTML

Mapping and troubleshooting an existing Web site

When you generate a map for your site using the Internet Diagram solution, it creates a shape for each link in your Web site that includes information about the link, such as the location and link type. The solution also adds hyperlinks to shapes so you can jump directly from the shape to the link the shape represents.

The home page shape is positioned at the top of your site map. The shapes connected to it represent the links on the home page. The same model holds throughout the chart.



You can generate a site map for files on a remote Web site, local hard drive, or network server.

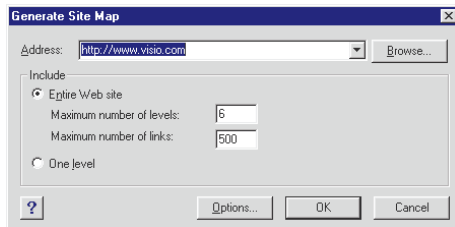
You can also specify what you want to include in your site map—the maximum number of links (the default is 500), the maximum number of levels (the default is 6), and the kinds of links (for example, HTML pages, ASP pages, Image Files, and so on).

NOTE When you're mapping a site, it's a good idea to limit the search in some way. For example, if you want to use your site map to analyze your site's navigation patterns, you probably don't want all the links to images to appear in your site map. Or you might not want links to all the multimedia files on your site to appear in your site map. You can set these search parameters in the Options dialog box on the Links tab.

If the Internet Diagram solution encounters an error when browsing for a link (for example, Failed To Load), it creates a shape for the link with an X through it, indicating the link is broken. The solution also creates a log file that contains information about broken links. After you fix the link on your Web site, you can either turn off the error marking for a shape or regenerate a portion of the site map for all the links on a specific page.

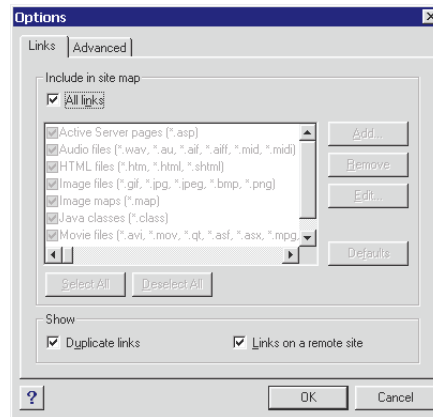
To map an entire Web site

- 1 Start Visio 2000. In the Welcome To Visio 2000 dialog box, click OK.
- 2 In the Choose Drawing Type dialog box, click Internet Diagram.
- 3 In the Drawing Type box, double-click Web Site Map.
- 4 In the Generate Site Map dialog box, do one of the following:
 - If the site is on an HTTP server, in the Address box type the address for the Web site you want to document, such as www.visio.com.
 - If the site is on a network server or local hard drive, click Browse, navigate to the file you want at the root of your site map, and then click Open.
- 5 Under Include, select Entire Web Site.



When you create a site map for an entire Web site, you can specify the number of levels and links you want to map. When you create a map for only one level, the solution maps all the links at that level.

- 6 Enter the maximum number of levels you want to search or accept the default (6). Enter the maximum number of links you want to search or accept the default (500).
- 7 Click Options, and then, on the Links tab, choose the links you want to include in your site map.



You can specify the types of links you want to show in your site map, whether you want to display duplicate links, and whether you want to display links to remote sites.

- 8 Click OK to begin generating the site map.

The site map is laid out automatically, and the page is resized to fit the site map.

- 9 If the solution finds broken links on your site, it generates a log file that contains information about them. Click OK to view the log file, or Cancel to return to your site map.

You can view the log file later by choosing Web > View Log File.



For details, use these online Help keywords:

- Internet Diagram
- Laying out shapes automatically



For details, use these online Help keywords:

- Internet Diagram
- HTML

NOTE To generate a site map, the Internet Diagram solution examines the HTML code for a page and searches for attributes, such as HREF, USEMAP, and SRC. It examines each attribute, and then displays the links that match your specifications on the Links tab, such as HTML pages, Images, and so on. You can add more attributes to the search list using the Advanced tab in the Options dialog box.

After you generate a site map, you can change the layout of your drawing by choosing Web > Lay Out Links. Also, you can move portions of your map to separate pages using the Make Subpage command on a shape's shortcut menu.

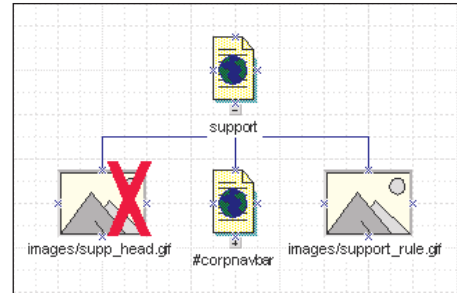
Using your site map to troubleshoot your Web site

You can quickly find each shape that represents a broken link in your site map and determine what caused the errors by viewing details for the shape in the site map or the log file. Then, fix the link on your Web site or report the errors to the webmaster and update your site map to show that the link has been fixed.

NOTE Your Web site and site map are not dynamically linked. Fixing the broken links on your Web site does not update your site map and vice versa. You must fix broken links on your Web site and update your site map separately.

To determine the error that caused a broken link and manually update the shape in your site map

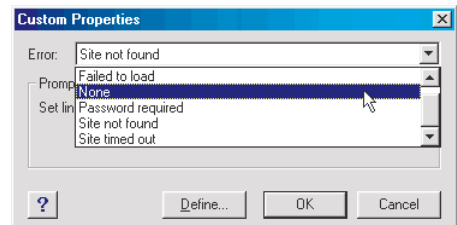
- 1 Look for a shape with an X through it in your site map. Or view the log file for the site by choosing Web > View Log File.



Shapes with Xs through them represent broken links.

- 2 Right-click the shape, and then choose Properties from the shortcut menu.
- 3 In the Error box, choose None, and then click OK.

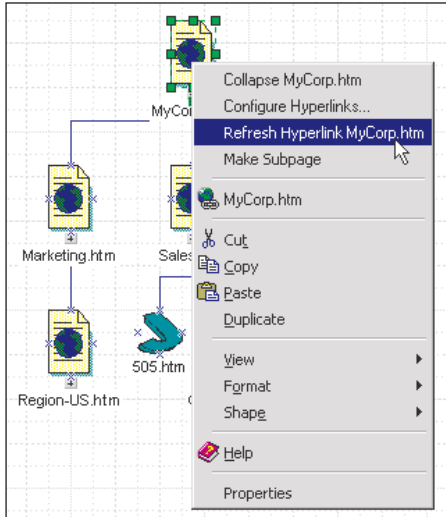
The X disappears.



In the Error box, you can view the type of error, and then delete the error marking on the shape by choosing None.

To automatically update your site map by regenerating a portion of it

- Right-click the shape that represents the HTML or ASP page whose links you want to map again, and then choose Refresh.



Saving your site map as an HTML page

You can save your site map as a Visio diagram and use it as a visual aid in maintaining your Web site. You can also save the diagram as an HTML page and include it on your Web site. The links from shapes in your site map to Web locations are retained when you save the diagram.

To save your site map as an HTML page

- 1 Choose File > Save As.
- 2 Type a name for the site map using the .htm extension, such as sitemap.htm.
- 3 For Save As Type, choose HTML Files (*.htm, *.html), and then click Save.
- 4 In the Save As HTML dialog box, choose the location where you want to save the file, the graphics format, and the drawing pages you want the HTML file to include, and then click OK.

You are prompted to view the HTML pages.

- 5 Click Yes to open your Web browser and view the first HTML page.

Design software components

Microsoft® Visio® 2000, Professional Edition supports the major object-oriented and data-oriented software modeling and design languages, including the Unified Modeling Language (UML). Using the software solutions, you can

- Create integrated system models using the UML, and reverse engineer information models from source code created in Microsoft Visual C++® 6.0, Microsoft Visual Basic® 6.0, or Microsoft Visual J++® 6.0.
- Design and document software projects using object-oriented methodologies, such as Booch, ROOM, and Rumbaugh.
- Show the procedural components of programs using structured charts, such as Nassi-Schneiderman charts.
- Create data flow diagrams that use automatic level-balancing with the Data Flow Model Diagram solution.

Topics in this chapter

<i>Software modeling and design solutions</i>	<i>62</i>
<i>Using the UML solution.....</i>	<i>64</i>
<i>Reverse engineering source code into the UML</i>	<i>74</i>

Software modeling and design solutions



Each software modeling and UI design solution includes online Help. To access this information, search on a solution name in the online Help.

This chapter introduces the range of software design and modeling solutions available in Visio 2000 and provides a conceptual overview of the Visio approach to modeling in the UML.

You can open these solutions by choosing File > New > Software, and then choosing the solution you want to use.

Each software modeling solution consists of SmartShapes® symbols programmed to behave according to the rules of the specific modeling methodology. The UML and Data Flow Model Diagram solutions also build and display models as hierarchical tree views in a navigator.

Booch OOD Supports the creation of object, class, timing, state, module, and process diagrams using Booch object-oriented design notation. (Aspects of the Booch method have been subsumed into the UML.)

COM and OLE Supports the creation of COM (Component Object Model) objects and interfaces and system diagrams.

Data Flow Model Supports the creation of data flow diagrams using Gane-Sarson notation. This solution includes a navigator to help you quickly move between levels and automatic level-balancing to prevent semantic errors in your model.

Fusion Supports the creation of diagram types included in the Fusion methodology.

Jackson Supports the creation of data and program structures using the Jackson software design method.

Jacobson Use Cases Supports the creation of use case, state transition, interaction, and other diagrams included in the Jacobson object-oriented software engineering method. (Aspects of the Jacobson approach have been subsumed into the UML.)

Nassi-Schneiderman Supports the representation of sequence, selection, case, and repetition in program structure charts.

Program Structure Supports the creation of structural diagrams of programs and memory objects.

ROOM Supports the creation of Real-Time Object-Oriented Modeling (ROOM) diagrams, which show the relationships among system components and system responses to events.

Rumbaugh OMT Supports the creation of object, dynamic, and functional diagrams using the Object Modeling Technique. (Aspects of OMT have been subsumed into the UML.)

Shlaer-Mellor Supports the creation of class diagrams, class structure charts, dependency diagrams, and inheritance diagrams using Shlaer-Mellor notation.

SSADM Supports the creation of logical data structures, data flow diagrams, entity life histories, and other system analysis and design diagrams.

System Structure Supports the creation of diagrams that represent Microsoft Windows® and Macintosh operating systems and user interfaces.

UML Supports the creation of integrated system models based on the UML version 1.2 diagram types: use case, class, object, sequence, collaboration, statechart, activity, component, deployment. You can also reverse engineer source code to create static structure models.

Windows User Interface Supports users who need to develop, document, or prototype Microsoft Office and Microsoft Windows user interfaces.

Yourdon and Coad Supports the creation of object state, data flow, and other diagrams included in Yourdon and Coad object-oriented analysis and design notation.

Using the UML solution



To read a PDF file, you must install Adobe Acrobat Reader: On the Microsoft Visio 2000, Professional Edition CD, in the Acrobat folder, double-click the Ar40eng.exe file.

The UML Model Diagram solution in Visio 2000 offers full support for the collaborative creation of object-oriented software system models. The solution includes the following tools, shapes, and functionality:

- **The UML Navigator**, which provides a tree view of your system model and a means of navigating from one view to another.
- **Predefined shapes** representing all the elements in the UML notation that support the creation of all UML diagram types. The shapes are programmed to behave in ways that are consistent with the UML semantics.
- **Easy-to-access UML Properties dialog boxes**, where you can add attributes, operations, and other properties to UML elements.
- **The ability to reverse engineer** Visual C++, Visual J++, or Visual Basic source code.
- **Online Help**, which you can use to find the meanings of UML-specific terms, learn how to work with shapes and create specific diagram types, choose property values, and more.

You can also consult the complete *OMG Unified Modeling Language Specification* (version 1.2), which is available in PDF format with Microsoft Visio 2000, Professional Edition. During installation, choose to install the Online Documentation feature, and the guide will be available in the \Visio\Docs folder.

For details about the UML solution environment, “Working with the UML solution” on page 66.

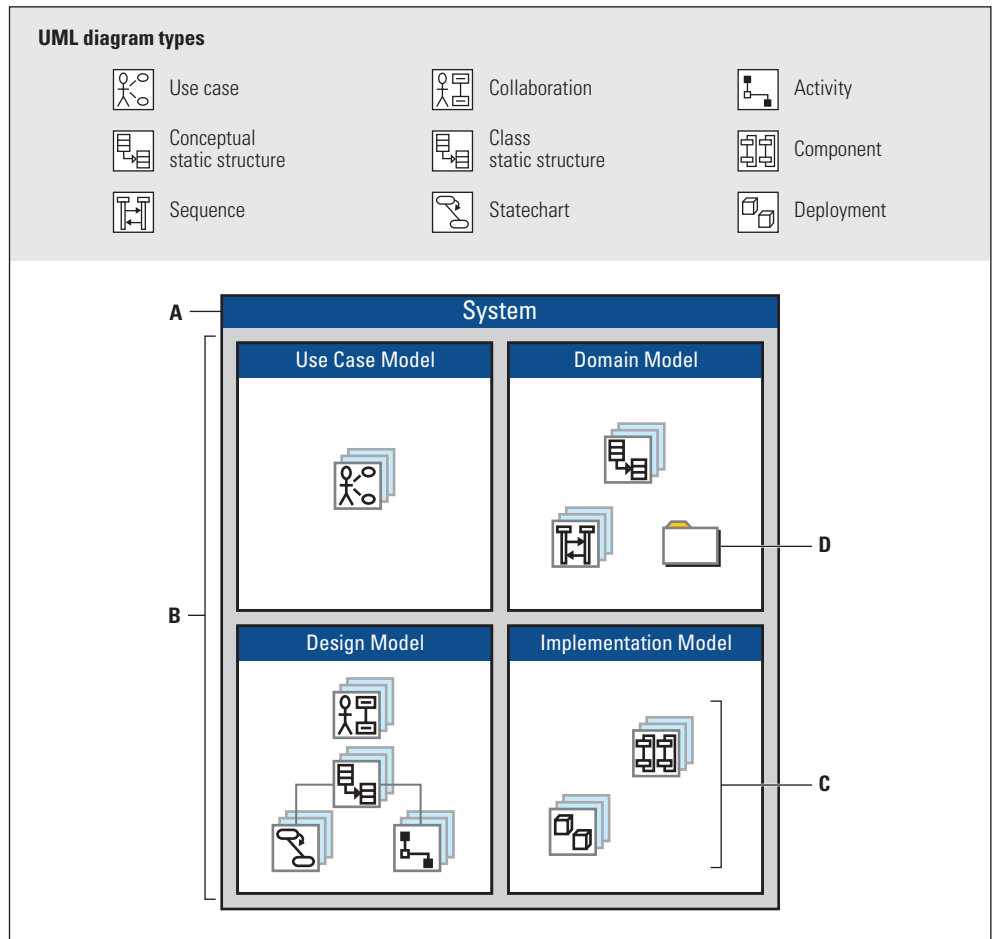
The Unified Modeling Language

The UML is used to specify, construct, visualize, and document the artifacts of a software-intensive system.

The vocabulary of the UML is a notation—a set of shapes and symbols. Its semantics indicates the meaning of the shapes and the rules about their use. In combination, the notation and semantics make it possible to model all kinds of systems, regardless of their scope and complexity.

The UML notation includes elements that support the creation of several diagram types. Each diagram provides a different view of one model of a software system. The illustration on the next page shows the different phases involved in modeling a system using the UML.

Modeling a software system using the UML



- A** One UML drawing file represents the system you're modeling.
- B** Each model in the system is an abstraction that reveals the system from a different perspective.
- C** Each diagram is a different view of a model. In the UML Model Diagram solution, each diagram type is represented by an icon that resembles the icons pictured here.
- D** Packages contain related elements, and partition models and diagrams into manageable subsets.



For details, use these online Help keywords:

- *UML*
- *Models*
- *Elements*
- *Data types*
- *Properties of UML objects*

Working with the UML solution

Visio 2000 supports the creation of complex system models and all of the UML diagram types. When you model a system using the UML Model Diagram solution, you perform these iterative steps:

- 1 Add a new model to the existing system or edit the current model. This step includes setting up data types for the model.
- 2 Start a new diagram within a model.
- 3 Add UML elements to a model.
- 4 Associate properties with UML elements.

Understanding the Visio 2000 approach to the UML will help you work more efficiently. The illustrations on the following pages present the UML solution shapes and interface, and provide an overview of the UML solution.

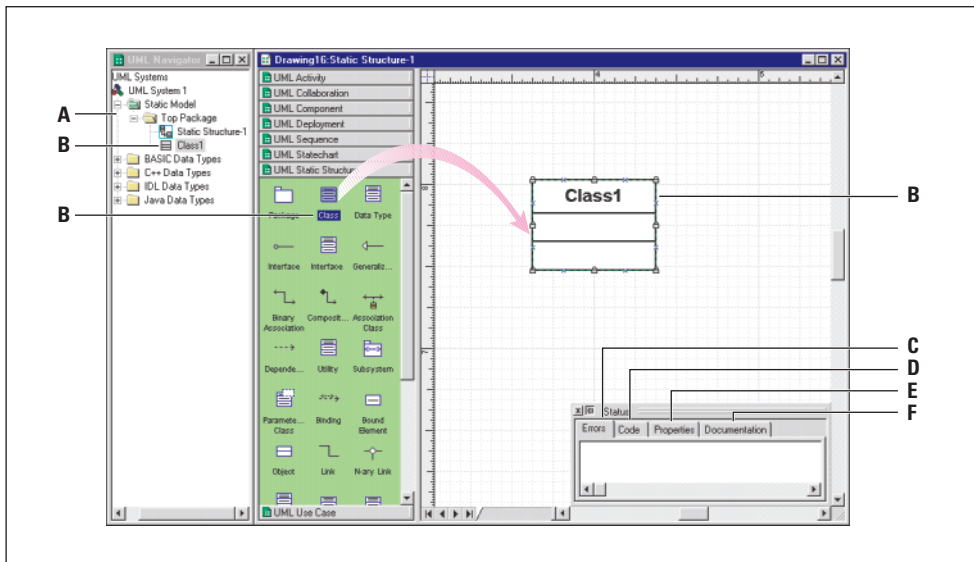
NOTE *To open the UML solution, choose File > New > Software > UML Model Diagram.*

The UML drawing file and system models

One UML drawing file represents a system. In the UML Model Diagram solution, the models you develop for a system, such as a new computer game, a library information system, or a process for assembling microchips, are contained within one UML drawing file. System model files are saved with a .vsd extension.

When you open the UML solution, you'll see the UML Navigator window, a Status window, UML diagram stencils, and the drawing page.

TIP To work with the UML solution without viewing the system model, hide the UML Navigator. To hide the UML Navigator, choose UML > UML Navigator.



The UML drawing file

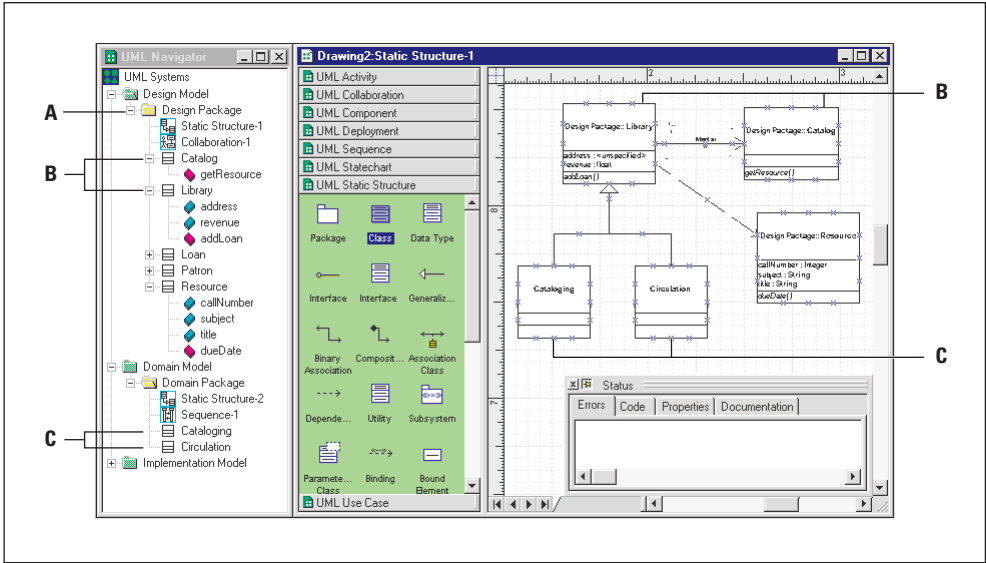
- A** Your system model appears in a tree view in this section of the UML Navigator. As you add elements to the model, icons corresponding to the elements appear in the tree view.
- B** When you drag shapes from the available UML stencils onto the drawing page, many of the shapes also appear as icons in the tree view.
- C** Property values associated with UML elements appear in the Properties tab of the Status window.
- D** Documentation tagged values associated with UML elements appear in or can be added in the Documentation tab of the Status window.

Packages in a system

A package is the basic organizing element of a UML model. You can think of the entire system as a package that contains all the other

packages, models, diagrams, and elements. An element is owned by only one package, but you can include a reference to the element in other packages.

Packages and elements

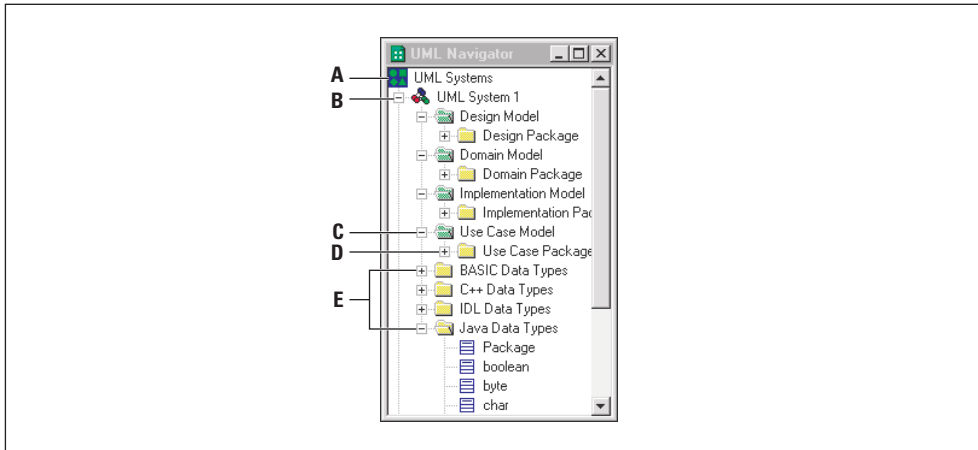


- A** You can add a new element to a package in the model by right-clicking the package icon () in the tree view, choosing New, and then choosing the element you want to add.
- B** If you drag an icon for an element in one package and drop it into a diagram in another package, a view of the element is automatically created in the second package. The element's name includes a reference to its original package. For example, the Library and Catalog classes in this drawing originated in the Design Package.
- C** When you add an element to a diagram by dragging a shape from a stencil onto the drawing page, the element is also added to the package in the model that contains the diagram (or view). For some elements, an icon appears in the tree view.

The system and its models

To make a complex system more understandable, you can create different models, or abstractions, of the system and its parts. A model usually relates to a specific phase of development. One system can include many models.

In the UML Model Diagram solution, all the models for a system appear in the same drawing file, and each model is visible in the tree view.



Models in the tree view

- A** The Visio icon () represents the UML Model Diagram file (UML Systems) as a container for all the systems you want to model.
- B** The system icon () represents the system you are currently modeling. To add a model to the system, choose UML > Models.
- C** The green folder icon () represents one model, or abstraction, of your system, in this case, a use case model. To rename an element in the model, click the element icon's text once, and then click the text again. Type the new name.
- D** The yellow folder icon () represents the top package in the use case model. Packages are containers, and this package, which is created automatically when you create a new model, contains all the model elements.
- E** These packages contain the common BASIC, C++, IDL, or Java data types. You can delete these packages, and you can also create packages that include your own data types.

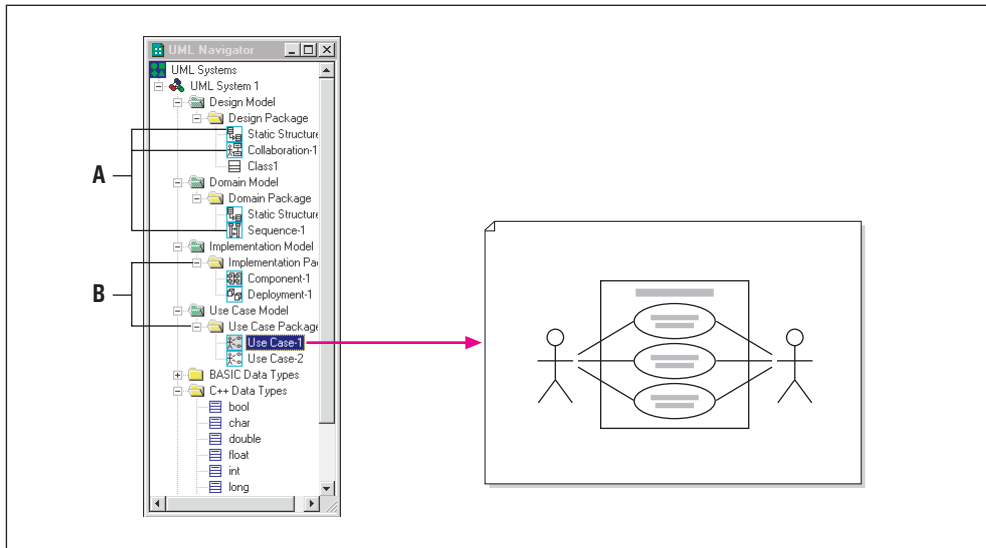
Different views of the same model

To thoroughly consider a system, you must approach it from different perspectives or views. In the UML, a view corresponds to a diagram. For example, use case diagrams show the system from a user's perspective. Class

static structure diagrams take user requirements and translate them into software classes and relationships.

This illustration shows a use case view and its corresponding diagram.

Each type of UML diagram presents a different view of a model.



A Each diagram type is identified by a different icon, and each diagram icon corresponds to a drawing page.

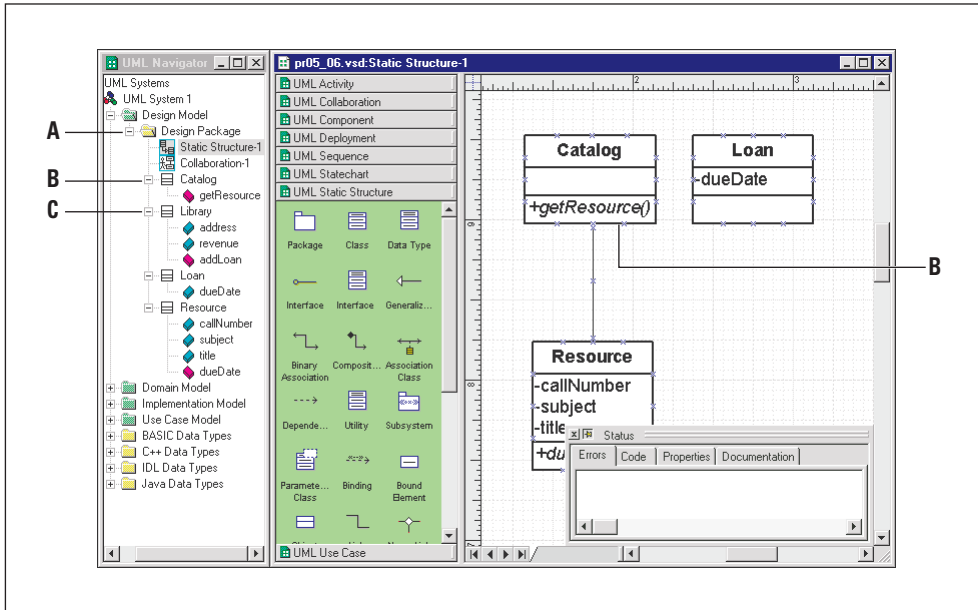
B When you create a new diagram, you automatically display a new drawing page and the stencil containing the UML elements you need.

The tree view and diagrams

The tree view in the UML Navigator provides a comprehensive picture of the models of a system and of most elements in each model.

Each diagram is a snapshot of a model and is composed of shapes representing UML elements.

Some elements, such as classes, use cases, and components, might exist in a model without necessarily appearing in a diagram.



Tree view and diagram

- A** Under a package, diagrams and then elements are listed alphabetically by name.
- B** You add views of elements to a diagram by dragging either a shape from a stencil or an element icon from the tree view and dropping it onto the drawing page.
- C** Some elements in the model in the tree view might not appear graphically in any diagram.



For details, use these online Help keywords:

- Properties of UML objects
- Elements

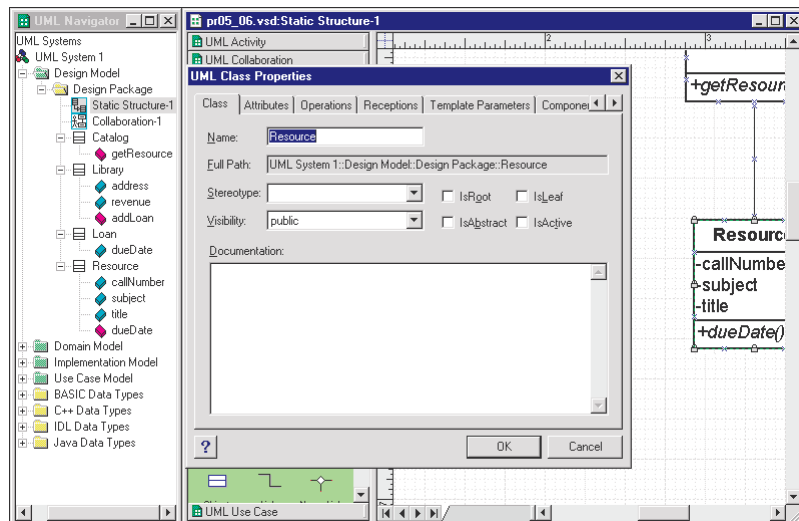
Properties for UML elements

Properties are features associated with UML model elements that become integral parts of those elements. For example, you can associate attributes, operations, and other properties with classes in class static structure diagrams. You can also add discretionary values called tagged values to any UML element.

NOTE To open an element's UML Properties dialog box, double-click the element in the tree view or the shape that represents it on a diagram.

Set UML element properties in the UML Properties dialog box.

An element's UML Properties dialog box includes tabs for the various supported properties. You can click a tab to add values associated with a specific property.

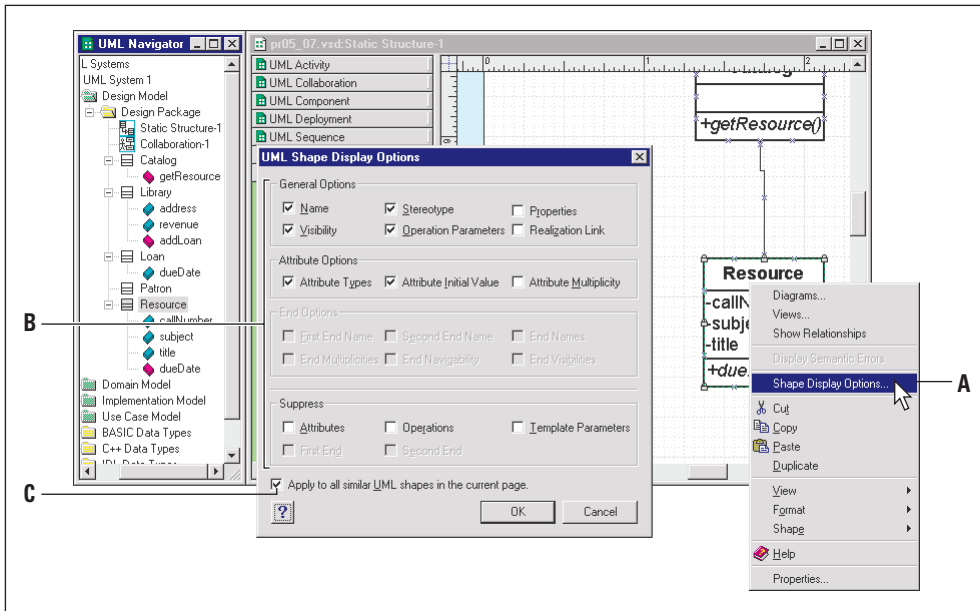


Display preferences for shapes

For any UML element on a diagram, you have the option of showing or hiding specific properties. For example, on a class element, you can choose to hide its attributes or operations.

You can apply shape display options to a single element or to all element shapes of the same type on the page.

NOTE Right-click a shape and choose *Shape Display Options* to control which properties are displayed on a shape.



The UML Shape Display Options dialog box

- A** Use the UML Shape Display Options dialog box to control which properties are displayed on a shape.
- B** Use these options to show or hide specific properties of a shape.
- C** Check this option to apply the same settings to all UML shapes of the same type on the current page.

Reverse engineering source code into the UML



You can quickly access online Help by clicking the Help button on the Visio UML Add-In toolbar.

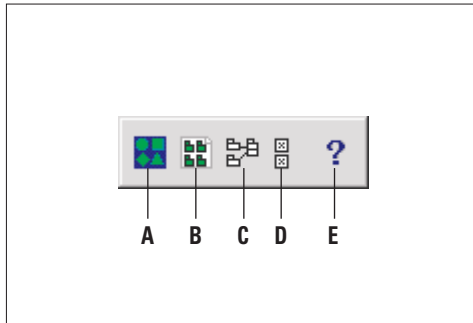
If you develop projects in Visual C++, Visual J++, or Visual Basic, you can use the UML solution in Visio 2000 to reverse engineer your projects' class definitions and then generate UML static structure models.

The reverse engineering process automatically generates a model from your source code in the tree view of the UML Navigator. You can then drag icons from the tree view onto a drawing page to create static structure diagrams, and

you can access the properties of UML elements by double-clicking an icon in the tree view or a shape on the drawing page.

NOTE This solution supports reverse engineering only for version 6.0 of Visual C++, Visual J++, and Visual Basic. Service Pack 3.0 for Microsoft Visual Studio® must be installed for the Visio UML Add-Ins to function properly.

Visio UML Add-In toolbar



When you customize Visual C++, Visual J++, and Visual Basic using the Visio UML Add-Ins, this special toolbar for reverse engineering to the UML solution becomes available.

- A Open Visio button** Click to start Visio 2000 and choose the solution you want to open.
- B New Visio UML Document button** Click to open the UML solution in Visio 2000.
- C Reverse Engineer UML Model button** Click to reverse engineer the source code for a specific project, open the UML solution, and display the results as icons in the tree view.
- D Visio UML Options button (Visual C++ only)** Click to set options for including or excluding MFC classes, ATL classes, or standard Include files.
- E Visio UML Help button** Click to open the Visio UML Help topics on reverse engineering source code.

When you reverse engineer source code using the UML Model Diagram solution and the Visio UML Add-In, you perform these general steps:

- 1 Within your Visual C++, Visual J++, or Visual Basic application, customize the interface with the Visio UML Add-In. This step makes the Visio UML reverse engineering toolbar available in the application.

NOTE *Your installation of Microsoft Visio 2000, Professional Edition includes the DLL files used to customize Visual C++ 6.0, Visual J++ 6.0, and Visual Basic 6.0.*

In Visual C++, you also need to generate a Browse Information file. For instructions, see “Browse Information files” in online Help.

- 2 Open or select the project that contains the source code you want to reverse engineer.
- 3 Click the Reverse Engineer UML Model button () on the Visio UML reverse engineering toolbar.

The UML Model Diagram solution opens in Visio 2000 with a blank static structure diagram drawing page, and the tree view in the UML Navigator is populated with icons that reflect the class definitions in the source code.

- 4 In the UML Model Diagram solution in Visio 2000, drag icons from the tree view onto the drawing page to create a static structure diagram that represents a view of the model.



For details, use these online Help keywords:

- *Reverse engineering source code*
- *Visual C++*
- *Visual J++*
- *Visual Basic*
- *Language mapping*

Design database models

Database models allow you to visualize the structure of a database by representing the elements in its schema graphically. You can use a database model to share design information with other IT professionals and to communicate more easily with users to ensure that the database meets their needs.

With the Microsoft® Visio® 2000, Professional Edition Database Model Diagram template, you can use entity relationship (ER) and IDEF1X notation to model relational and object-relational database schemas. You can

- Reverse engineer database schemas from the leading database management systems (DBMSs).
- Create new database models for relational and object-relational databases.
- Refine database models by modifying the properties of tables, views, columns, and relationships.

Topics in this chapter

<i>Understanding database modeling.....</i>	<i>78</i>
<i>The database modeling user interface.....</i>	<i>79</i>
<i>Starting a database model</i>	<i>82</i>
<i>Refining a database model.....</i>	<i>83</i>

Understanding database modeling

Visio 2000 provides powerful tools for reverse engineering database models and for creating new database models.

You can create a database model by reverse engineering from any supported DBMS, because Visio 2000 uses proprietary database drivers in association with your generic or vendor-supplied ODBC (Open Database Connectivity) drivers. These proprietary drivers are optimized to provide access to DBMS-specific functionality and improve communication with the DBMS.

In addition to generic ODBC and OLE DB drivers, Visio 2000 includes proprietary database drivers for the following DBMSs:

Desktop database drivers

- Corel Paradox 7, 8
- Inprise (formerly Borland) dBASE III, IV, 5; Inprise Paradox 3, 4.x, 5
- Microsoft Access 2.0, 7.0, 97, 2000; Microsoft FoxPro® 2.0, 2.5, 2.6; Microsoft Visual FoxPro® 5.0, 6.0

Client/server database drivers

- IBM DB2 Universal Database 2.1.2, 5.0
- Informix Dynamic Server, with support for the Universal Data Option; INFORMIX–SE 5.0; INFORMIX–OnLine 7.x; INFORMIX–Universal Server
- Microsoft SQL Server 4.2, 6.0, 6.5, 7.0
- Oracle 7.x, 8
- Sybase Adaptive Server 10, 11.x (formerly Sybase System); Sybase Adaptive Server Anywhere 6.x; Sybase SQL Anywhere 5.x

NOTE To see which proprietary Visio 2000 drivers are installed on your system, choose *Database > Options > Drivers*.

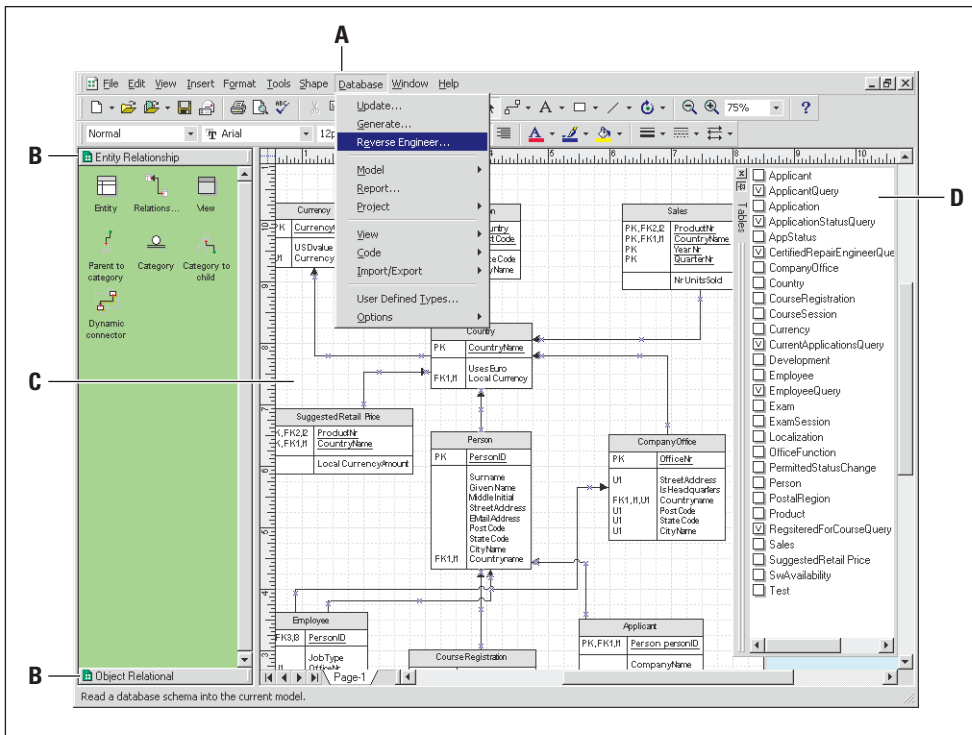
The Database solution includes six templates: Bachman, Chen ERD, Database Model Diagram, Express-G, Martin ERD, and ORM Diagram. This chapter focuses on the Database Model Diagram template, which provides tools for documenting and designing relational and object-relational database schemas.

For information about the other templates included in the Database solution, see online Help.

The database modeling user interface

When you create a database model in Visio 2000, the shapes on the drawing page represent the elements you want the database to store information about and the relationships among those elements. You can include other

information in your model, such as code for stored procedures, although such information might not be visible on the drawing page. When you save your database model, Visio 2000 saves it as a Visio drawing (.vsd) file.



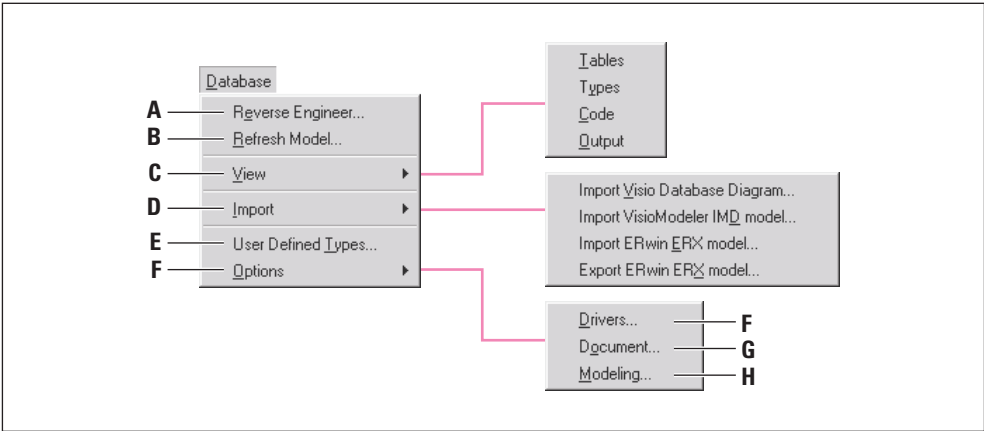
User interface for database modeling

- A** Choose commands for creating and refining models from the Database menu.
- B** Drag shapes from stencils onto the drawing page to add new elements to the model.
- C** Assemble shapes on the drawing page to represent the database model.
- D** Refine your model by working with elements in anchored windows.

Using the Database menu

The Database Model Diagram template includes a Database menu that displays data-base modeling commands. You also can right-click any shape on the drawing page to display component-specific commands.

Database commands



- A Reverse Engineer** Use to open the Reverse Engineer Wizard so that you can create a model from an existing database.

B Refresh Model Use to open the Refresh Model Wizard so that you can update your model from a database.

C View Use to open anchored windows (Code, Tables, Types, and Output).

D Import Use to import existing database models from PLATINUM ERwin, Visio Professional 5.0, and VisioModeler™.
- E User Defined Types** Use to create reusable user-defined data types.

F Options > Drivers Use to set default drivers, specify the database from which to extract or update a model, and set mapping preferences for reverse engineering and refreshing a model from a database.

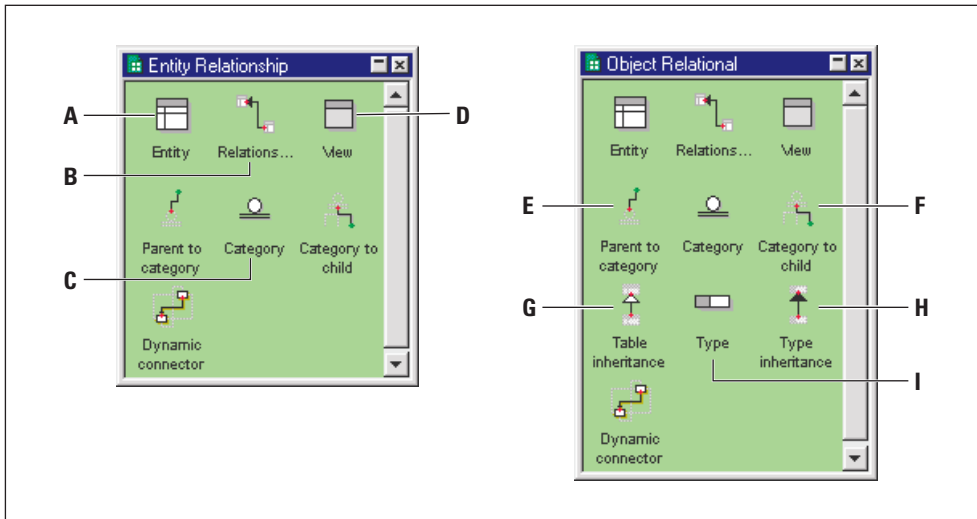
G Options > Document Use to specify notation-related and display options for the current database model.

H Options > Modeling Use to set default database modeling behavior for your current and subsequent Visio 2000 sessions.

Using shapes in a database model

The shapes in the Database Model Diagram template are designed to behave in accordance with the modeling method you choose. Use shapes from the Entity Relationship stencil to model relational databases, and use shapes from the Object Relational stencil to model relational or object-relational databases.

Visio 2000 supports IDEF1X and Relational (ER) notation. The way the shapes in a model appear on the screen is determined by the notation- and display-related options you select in the Database Document Options dialog box (choose Database > Options > Document).



Shapes for creating logical models using ER or IDEF1X notation

Choose to use shapes from the Entity Relationship or Object Relational stencil based on the type of DBMS you will use to create the physical database.

- A Entities** represent the tables in which you store data. Object-relational tables can include complex types, which act like nested records.
- B Relationship** connector shapes show the foreign key relationships between tables.
- C Categories** show the relationship of multiple child tables that represent subtypes to a parent table.
- D Views** contain columns derived from other tables and represent alternative combinations of information stored in the database.
- E Parent To Category** connector shapes link a parent table to a Category shape.
- F Category To Child** connector shapes link child tables to a Category shape, and establish foreign key relationships with the parent table.
- G Table Inheritance** connector shapes set child tables to inherit or derive the attributes of a parent table automatically.
- H Type Inheritance** connector shapes set a type to inherit or derive the attributes of a parent type automatically.
- I Type** shapes allow you to embed subtables in an object-relational database model diagram by defining a composite type that has multiple columns and assigning it as the data type for a column in a table.

Starting a database model

With the Database Model Diagram template, you can take one of three approaches to start a database model, depending on your project's requirements.

Extract a model from an existing database.

With the Reverse Engineer Wizard you can improve, enhance, and extend an organization's existing databases. You can extract code stored as part of the database schema and review and edit the code as you refine your model.

Create a new model from scratch. With Visio 2000 tools and controls, you can plan and design complex databases.

Import an existing model from PLATINUM ERwin, Visio Professional 5.0, or VisioModeler.

Importing an existing database model saves time by building on existing information.

To reverse engineer a database model

- 1 In Visio 2000, choose File > New > Database > Database Model Diagram.
- 2 Choose Database > Reverse Engineer to start the Reverse Engineer Wizard.
- 3 Follow the instructions in the wizard.
- 4 Drag tables from the Tables window to the drawing page.

To create a new database model

- 1 In Visio 2000, choose File > New > Database > Database Model Diagram.
- 2 From the Entity Relationship or Object Relational stencil, drag entity, relationship, view, and other shapes onto the drawing page to create your model.
- 3 Refine the elements in the model.

To import a database model

- 1 In Visio 2000, choose File > New > Database > Database Model Diagram.
- 2 Choose Database > Import, and then choose the command that corresponds to the type of database model you want to import.
- 3 In the Import dialog box, select a file to import, and then click OK.

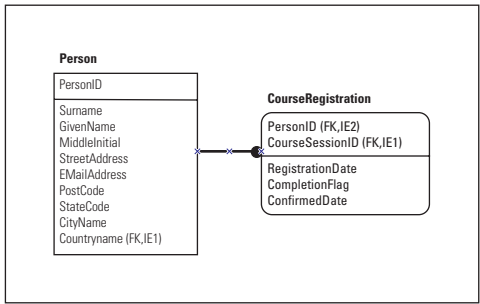
Refining a database model

You can add, modify, or delete the elements in a database model, and you can display more or less detail in the model diagram. You can also define and edit data types, stored procedures, and extended attributes.

Working with tables and columns

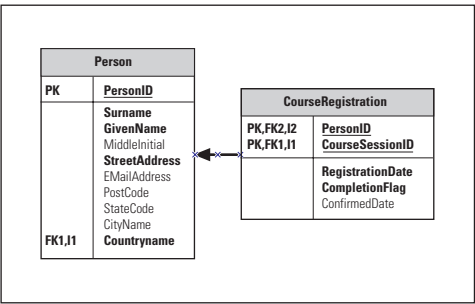
You can add new tables to and remove existing tables from a logical database model, and you can edit table properties, such as the definitions of columns in a table.

Tables in a database model are represented by the Entity shape. The way tables are displayed in a logical model depends on whether you display the model in IDEF1X notation or Relational (ER) notation, the level of detail you want to display, and whether you display relationships by using Crow's Feet notation.



These Employees and Orders tables are displayed in IDEF1X notation. The rounded corners on the Orders table indicate that it is a dependent table.

IDEF1X tables are classified as independent or dependent. Independent tables include no foreign keys within their primary keys and are indicated by rectangles with square corners. Dependent tables include one or more foreign keys within their primary keys and are indicated by rectangles with rounded corners. There is no graphical notation for independent and dependent tables in models that use Relational notation.



This Employees table is displayed in Relational notation. Primary, alternate, and foreign keys are visible on the table.



For details, use these online Help keywords:

- Database modeling preferences
- Database model diagrams
- Reverse engineering database
- Importing database models

Tables displayed in IDEF1X notation and Relational notation



You can change the default behavior for deleting elements from a model by choosing Database > Options > Modeling and selecting options on the Logical Diagram tab. For details, see online Help.

To add a new table to a database model

- 1 Open the drawing file that represents your model.
- 2 From either the Entity Relationship or Object Relational stencil, drag an Entity shape onto the model drawing page.

To remove a table from a model diagram

- Select a table shape on the drawing page and then press Delete.

The table is removed from the diagram but remains listed in the Tables window.

To remove a table from a model

- Select the table in the Tables window, and then press Delete.

To edit the properties of a table in a database model

- 1 Double-click the table whose properties you want to edit.

TIP *You can also right-click the table and then choose Database Properties from the shortcut menu to display the Database Properties window.*

- 2 In the Database Properties window, click the tab that contains the information you want to edit, and make your changes.

The database model diagram is updated automatically. You can choose Edit > Undo to reverse the changes.

Here is a brief description of each tab and the options it contains.

Definition Specify physical and conceptual names for the table and whether to synchronize the names. You can specify a name space value for the table to distinguish it from identically named tables in the model. This tab also displays information reported by the host DBMS about the database owner and the path of the source database. The Defining Type field is available only when a table is empty, and it lists all composite data types so that you can create a typed table.

Columns Add columns to a table and edit the properties of columns in a table.

Primary ID Edit, define, or delete primary keys from a list of available columns and specify whether to create an index on primary keys.

Indexes Create, edit, define, rename, delete, or set extended attributes for indexes. Use this tab to specify the type of index you create for a particular column.

Triggers Add, edit, remove, or preview the code for triggers related to the selected table.

Check Add, edit, remove, or preview the code for check clauses related to the selected table.

Extended Set DBMS-specific extended attributes.

Notes Type text to document the table.

NOTE *To get online Help for an option on a tab, press F1, and then click This Window.*

Adding and editing columns and primary keys

You can refine the tables in your database model by adding, editing, and deleting columns and their properties. Each table must have at least one column that is declared as a primary key. Primary keys have unique values, which are used to identify rows of the table in a database. Columns can also be declared as foreign keys. A foreign key describes the relationship of a child table to a parent table by defining the attribute of the parent table that the child table references.

To add a new column to a table

- 1 Open the drawing file that represents your database model.
- 2 Double-click the table to which you want to add the column, and then click the Columns tab in the Database Properties window.
- 3 On the Columns tab, click in the first blank line and type a new Physical Name. Alternatively, click the Add button.

Specify a data type by typing or by selecting one from the drop-down list for the Data Type field. To prevent null values, check the box in the Req'd column. To include the column in the table's primary key, check the box in the PK column.

- 4 *Optional* To access additional options for a column, such as advanced data type options, select a column by clicking its name, and then click Edit. Select options on tabs in the Column Properties dialog box. When you're finished, click OK.

To edit or create a primary key for a table

- 1 Double-click the table to which you want to add a primary key. In the Database Properties window, click the Primary ID tab.
- 2 Select the column you want to be the primary key in the Available Columns list, and use the Move button (>) to move it to the Primary ID list.

Optional Instead of clicking the Primary ID tab, click the Columns tab in the Database Properties window, and then check the PK box for each column you want to include in the primary key.

NOTE *The position of primary keys in your table depends on the Order option you select on the Table tab in the Database Document Options dialog box (choose Database > Options > Document). If you select Physical Order, primary keys are displayed in the order they will have in the database. Otherwise, primary keys are displayed at the top of a table.*

To edit the properties of a column in a table

- 1 Double-click the table that contains the column you want to edit, and then click the Columns tab in the Database Properties window.
- 2 On the Columns tab, select a column by clicking its name, and then click Edit.
- 3 In the Column Properties dialog box, click the tab that contains the information you want to edit, and make your changes. You can choose Edit > Undo to reverse the changes.



For details, use these online Help keywords:

- Primary keys
- Foreign keys
- Triggers
- Code
- Check clauses
- Category tables
- Database modeling preferences
- Columns
- Tables



If the Database Properties window is hidden, move your pointer over its title bar to make it reappear.

Here is a brief description of each tab and the options it contains.

Definition Enter or edit a Physical Name to control the column's name in the database or a Conceptual Name to control the column's name as it appears in the model. Check Allow NULL Values to make the column optional rather than mandatory.

NOTE *Checking Allow NULL Values in the Column Properties dialog box has the same effect as unchecking the Req'd box for the column on the Column tab of the Database Properties window.*

Data Type Assign data types to columns, and select Show Portable Data Type to display a logical view of the model or Show Physical Data Type to display a physical view of the model.

Collection Specify whether the column is a single value or contains a collection of information. Collections might be sets, lists, or multiple values, and may be used only in object-relational models.

Check Edit, add, remove, or preview check clauses for the column.

Extended Set DBMS-specific extended attributes for the column.

Notes Type text to document the column.

- 4 Click OK to close the Column Properties dialog box.

Creating and editing indexes for a table

Indexes help your database system find and sort records faster. Creating indexes for columns you plan to search frequently can significantly improve your database's performance.

Visio 2000 automatically creates unique indexes on primary keys. You can define indexes manually, and you can modify the indexes that are created automatically. You edit the properties of an index in the Database Properties window when the table containing the index is selected.

NOTE *Some database applications place a limit on the type and number of indexes you can create per table. For specific information, see your DBMS documentation.*

To create a new index for a table

- 1 Open the drawing file that represents your database model.
- 2 Double-click the table to which you want to add an index.
- 3 In the Database Properties window, click the Indexes tab, and then click New.
- 4 Enter a name for the index, and then click OK.
- 5 From the Available Columns list, select the name of each column that you want to include in this index, and then click the Move (>) button.
- 6 Check the Asc check box to create an index that has ascending sort order, or clear it to create one that has descending sort order.
- 7 From the Index Type list, select an option to create a unique or non-unique index.
- 8 *Optional* Click the Options button to set driver-specific extended index attributes.

Working with relationships

As you refine your database model, you can add and remove foreign key relationships between tables and edit relationship properties. Relationships indicate visually how the tables in your database model relate to one another, and by editing their properties you can control how data is stored and retrieved in the database. Relationships in a model are characterized in terms of direction, referential integrity, and cardinality. You can use the Relationship shape or the connector tool (☞) to define a foreign key relationship between two tables.

The originating table in a relationship is known as the parent; the receiving table that assumes or inherits attributes from the parent table is known as the child. When you add a relationship to your model, you establish the relationship's direction by connecting first to the parent table and then to the child table.

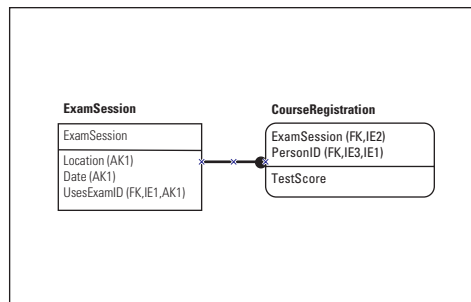
Attributes inherited from the parent table appear as foreign keys in the child table. Setting a parent/child relationship between tables enables you to specify referential integrity, which establishes the rules that govern what effect a change to the parent table has on the child table.

For example, a referential integrity rule might require that all employees be assigned to one of the company departments that are stored in another table. In this way, no employee can be assigned to a department that does not exist. The cardinality of a relationship describes how many records in a parent table can be directly related to records in a child table.

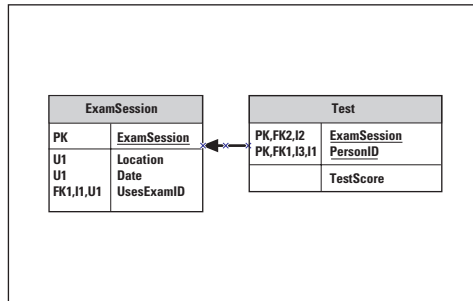


For details, use these online Help keywords:

- *Indexes in database tables*
- *Cardinality of database relationships*
- *Referential integrity*
- *Foreign keys*



In IDEF1X notation, the large dot at the end of the relationship line indicates the child table.



In Relational notation, the arrow at the end of the relationship line points to the parent table.

To create a foreign key relationship between tables

- 1 Open the drawing file that represents your database model.
- 2 Add at least two table entities to your model by dragging instances of the Entity shape onto the drawing page.
- 3 Add columns to each table by using the Columns tab of the Database Properties window.
- 4 Choose the connector tool () from the Standard toolbar, and then position it over the center of the parent table so that the table has a solid red outline. Drag the tool to the center of the child table so that it also displays a solid red outline, and then release the mouse button.

The connection points on both tables turn red, and primary keys in the parent table are added as foreign keys to the child table.

To edit the properties of a foreign key relationship

- 1 Double-click the relationship whose properties you want to edit.
- 2 In the Database Properties window, click the tab that contains the information you want to edit, and make your changes.

The database model diagram is updated automatically. You can choose Edit > Undo to reverse the changes.

Here is a brief description of each tab and the options it contains.

Definition Associate columns in the parent and child tables and enter role names for foreign keys.

Name Enter a Verb Phrase, Inverse Phrase, Physical Name, or Notes about the relationship.

Miscellaneous Specify the type of cardinality, whether the relationship is identifying or nonidentifying, and whether the relationship is optional.

Ref. Integrity Select options that determine the effect on the child table when information in the parent table is updated or deleted.

Working with views

With views, you can access information needed by the users of a database without changing the structure of the tables in the database. Views in the Database Model Diagram template make it easy to combine columns from several tables and perform operations on the data from those columns. For example, a view for invoices might combine columns from a table containing customer contact information, another containing employee information, and a third containing order details. Because the data in the view is inherited from columns in the other tables, database accuracy and efficiency are improved.

You can create views by dragging the View shape from the Entity Relationship or Object Relational stencil onto your database model diagram.

To add a view to a database model

- 1 Open the drawing file that represents your database model.
- 2 From either the Entity Relationship or Object Relational stencil, drag a View shape onto the model drawing page.

Visio 2000 adds a view to the model. You can set view properties and add columns to define the view.

NOTE When you use the View shape, Visio 2000 automatically creates SQL code to define the view. You can also use the Code Editor to define DBMS-specific views.

To assign columns from tables to a view

- 1 Double-click the view to which you want to add columns.
- 2 When the Database Properties window opens, click the Columns tab.
- 3 On the Columns tab, create a new column by entering a name in the Physical Name field of a blank row. Repeat to add additional columns to the view.
- 4 Select a column name and click Edit to define the column's properties.
- 5 In the View Column Properties dialog box, click the Source tab. Click Known Column In Another Table Or View, and then click Change.
- 6 In the Pick A Column dialog box, select a column from the list of tables and views in your model, and then click OK. Click OK again to close the View Column Properties dialog box.
- 7 Repeat steps 4 through 6 for each column you added.



For details, use these online Help keywords:

- Views
- Database modeling preferences

To edit the properties of a view

- 1 Double-click the view you want to modify.
- 2 In the Database Properties window, click the tab that contains the information you want to edit, and make your changes.

The database model diagram is updated automatically. You can choose Edit > Undo to reverse the changes.

Here is a brief description of each tab and the options it contains.

Definition Enter a Physical Name and a Conceptual Name for the view, and specify a Name Space. To create a typed view, select a type from the Defining Type list.

Columns Add columns to a view and edit the properties of columns in a view.

Join Criteria Define the source of columns included in the view.

SQL View the SQL code that defines the view. Uncheck Auto-Generate to edit the code directly in the dialog box, or click Code Properties to open the Code Editor.

Extended Set DBMS-specific extended attributes for use with the Visio 2000 database drivers.

Notes Type text to document the view.

To edit the properties of a column in a view

- 1 Double-click the view containing the columns you want to modify. When the Database Properties window opens, click the Columns tab.
- 2 On the Columns tab, click to select the column you want to modify, and then click Edit.
- 3 In the View Column Properties dialog box, click the tab that contains the information you want to edit, and then make your changes. The database model diagram is updated automatically. You can choose Edit > Undo to reverse the changes.

Here is a brief description of each tab and the options it contains.

Source Identify the source of the information for that column. Enter SQL code in the Definition Rule field to create a calculated value.

Definition Enter a Physical Name and a Conceptual Name for the view, and specify whether the column will allow NULL values.

Data Type Specify a data type for the column. Select Show Portable Data Type to assign a user-defined data type or a portable data type, or select Show Physical Data Type to assign a DBMS-specific data type.

Notes Type text to document the view.

- 4 Click OK to close the View Column Properties dialog box.

Use flowcharts to analyze your business



Using Microsoft® Visio® 2000, Professional Edition, you can diagram complex business processes to make them easy for others to understand.

You can create a flowchart diagram from scratch or import flowchart information from other applications. Either way, you can quickly and easily provide diagrams that illustrate your business process.

With Visio 2000, you can

- Facilitate communication between departments using business flowcharts, and then create reports to share with co-workers.
- Examine the causes of problems and see relationships among factors with cause-and-effect diagrams.
- Communicate how a process works or how to improve a process using cross-functional flowcharts.
- Create many other types of flowcharts, as shown in the table on the following page.

Topics in this chapter

<i>Creating business flowcharts.....</i>	<i>92</i>
<i>Working with cause-and-effect diagrams</i>	<i>96</i>
<i>Creating cross-functional flowcharts.....</i>	<i>98</i>
<i>Importing flowchart data from other applications.....</i>	<i>101</i>

Creating business flowcharts

Flowcharts are visual representations of a process and are frequently referred to as process flowcharts. Managers often create process flowcharts to help them understand and communicate how a process works and how it can be improved.

Visio 2000 provides a number of flowchart diagram types, as shown in the table below.

Flowchart diagram types in Visio 2000

Flowchart type	Purpose
Audit Diagram	Use to create auditing flowchart diagrams for accounting, financial management, fiscal information tracking, money management, decision flowcharts, and financial inventories.
Basic Flowchart	Use for flowcharts, top-down diagrams, information tracking diagrams, process planning diagrams, and structure prediction diagrams.
Cause-And-Effect Diagram	Use for diagrams that illustrate problem-solving.
Cross-Functional Flowchart	Use to create diagrams that illustrate the relationships between process and the organization.
Data Flow Diagram	Use for process- or data-oriented models, data flowcharts, data process diagrams, structured analysis diagrams, and information flow diagrams.
IDEF0 Diagram	Use IDEF0 process charting models to create hierarchical diagrams for model configuration management, needs and benefits analyses, requirements definitions, and continuous improvement models.
Mind Mapping Diagram	Use Buzan’s creativity techniques to create mind maps (graphical representations of thought processes) for brainstorming, problem solving, rational analysis, and decision making.
SDL Diagram	Use the Specification and Description Language (SDL) to create object-oriented diagrams for communication and telecommunication systems and networks.
TQM Diagram	Create Total Quality Management diagrams for business process re-engineering, total quality management, continuous improvement, and quality solutions.
Work Flow Diagram	Represent information flow, automation of business processes, business process reengineering, accounting, management, and human resources tasks in industry, business, and manufacturing.

To draw a flowchart using the connector tool

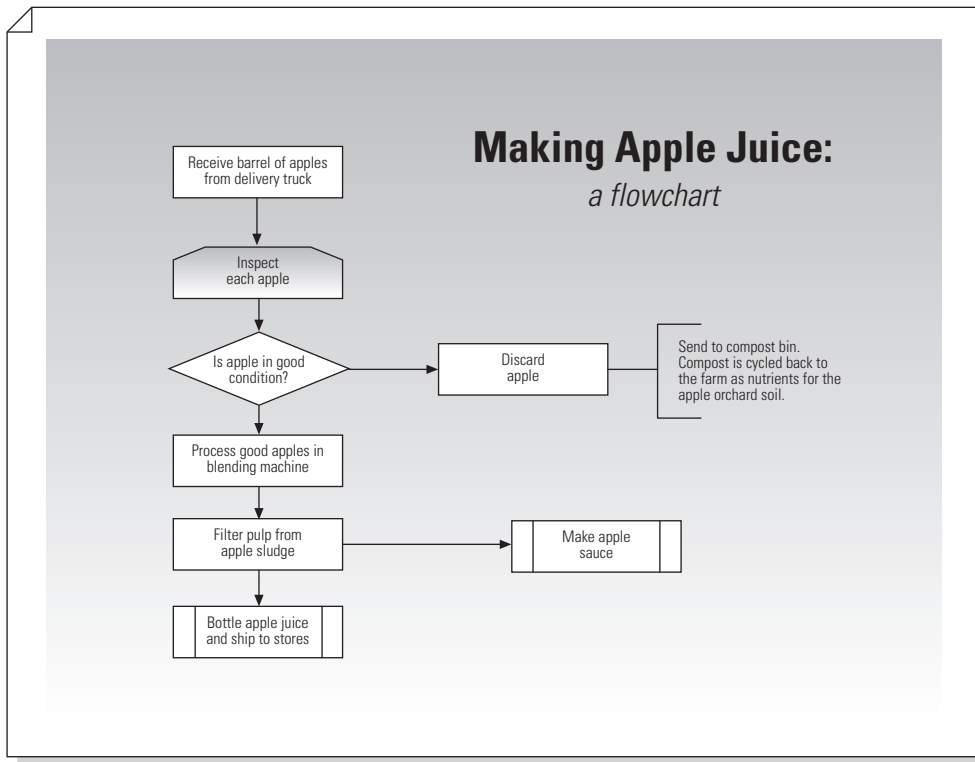
- 1 Start Visio 2000. In the Welcome To Visio 2000 dialog box, click OK.
- 2 In the Choose Drawing Type dialog box, click Flowcharts.
- 3 In the Drawing Type box, double-click Basic Flowchart.
- 4 Click the connector tool () on the Standard toolbar.
- 5 Drag a shape, such as a Process or Decision shape, from the Basic Flowchart Shapes stencil onto the drawing page.
- 6 Drag a second shape onto the drawing page. The shapes connect.
- 7 Drag enough shapes to build the complete flowchart. Each new shape you drop connects to the selected shape.



For details, use these online Help keywords:

- Basic Flowchart solution

Use flowcharts to illustrate a process





For details, use these online Help keywords:

- Custom properties
- Hyperlinks
- Reports

Adding information to your flowchart

You can add information to your flowchart in several ways. You can

- Add text to the shapes or on the drawing page by selecting shapes and typing.
- Add information, or custom properties, to flowchart shapes. This provides a way for you to store data, such as cost, duration, and resources that are associated with a process.
- Add navigational links to shapes in your flowchart to jump to separate drawing pages, separate files, or documents on an intranet or the Web.

For details about publishing to the Web, see “Publishing diagrams to the Web” on page 137.

To add custom properties to shapes

- 1 Right-click a 2-D shape in your flowchart, and then choose Properties from the short-cut menu.
- 2 Type the information you want for Cost, Duration, and Resources.

By default, Visio associates three custom properties, Cost, Duration, and Resources, with every 2-D flowchart shape.

NOTE To associate additional information for your flowchart shapes, right-click a shape, and then choose Properties. In the Custom Properties dialog box, click Define. Click New, and then enter information to create a new custom property.

To add a hyperlink to your flowchart

- 1 From the Borders And Titles stencil, drag a Hyperlink shape onto your page.
- 2 In the Custom Properties dialog box, specify the icon type you want from the list (such as Forward, Back, Home, and so on), and then click OK.

For example, you might choose the Forward button to link to a Web site for more information.
- 3 In the Hyperlinks dialog box, specify an address for the button to link to, and then click OK.

Working with large flowcharts

Large flowcharts frequently depict complex processes that span multiple pages.

Visio 2000 provides several useful methods for working with multiple-page flowcharts. For example, you can

- Use shape numbering to cross-reference explanatory notes, or to indicate the sequence of steps in a large business process.
- Use shapes called off-page reference shapes to navigate pages in multiple-page flowcharts, or to link to an existing page in your diagram.

To number shapes in your flowchart

- 1 With a flowchart drawing type open, choose Tools > Macros > Visio Extras > Number Shapes.
- 2 In the Number Shapes dialog box, specify the number assignments you want in the Number Assigned section.
- 3 Under Operation, choose the option you want.

Manually By Clicking Specifies that you can assign numbers one at a time so that you can specify the order.

Auto Number Specifies that numbers are automatically be assigned and begin a new sequence.

Renumber Maintaining Sequence Specifies that you can preserve an existing numbering sequence for shapes already numbered.

NOTE *If you choose the manual option, the Number Shapes dialog box appears instructing you to click a shape to assign the next number. When you finish assigning numbers, click the Close button.*

- 4 Under Apply To, choose whether you want to apply your numbering assignments to all shapes, or to selected shapes.
- 5 If you want to number shapes that you subsequently add to your flowchart, check the Continue Numbering Shapes As Dropped On Page box.

- 6 Click the Advanced tab and choose whether you want numbers to be placed before or after text in shapes, and applied to all or selected layers (if applicable). Also choose the numbering sequence and the renumbering option you want.

Check the Hide Shape Numbers box if you prefer that numbers not appear in shapes. Check the Exclude Connectors box if you don't want numbering to apply to connector shapes.

- 7 Click OK.

To connect to a new or existing page in your flowchart using the Off-Page Reference shape

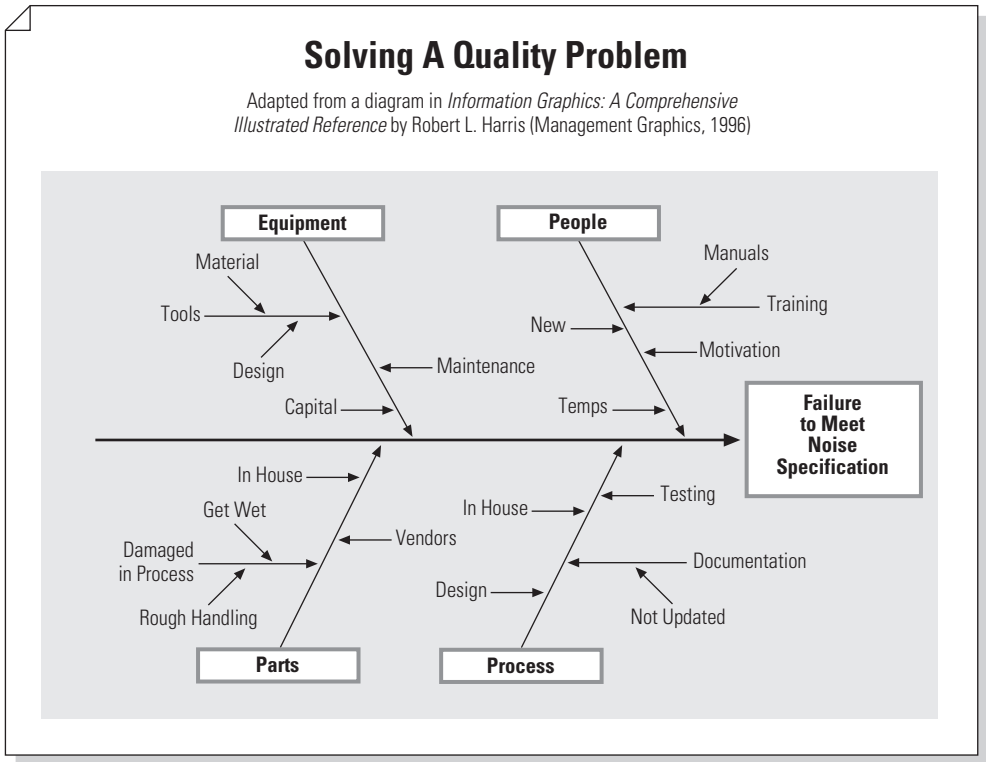
- 1 From the Basic Flowchart Shapes stencil, drag the Off-Page Reference shape and drop it onto the drawing page.
- 2 In the Off-Page Reference dialog box, choose whether you want to connect to a new page or to an existing page in your diagram.
- 3 If you chose to connect to a New Page:
 - Check the Drop Off-Page Reference Shape On Page box if you also want this shape to be added to your new drawing page.
 - Check the Keep Shape Text Synchronized box if you want text on both of the Off-Page Reference shapes to reflect changes when you add, modify, or delete the text for one of them.
 - Check the Insert Hyperlinks On Shapes box if you want to create links between the shapes. This is useful for navigating from shape to shape in large flowcharts.
- 4 Click OK.

Working with cause-and-effect diagrams

If you are a manager who works with Total Quality Management (TQM) principles, you can create cause-and-effect diagrams to explore the causes of quality problems and successes during the TQM process.

Cause-and-effect diagrams, also called fishbone diagrams, can document factors that affect a particular situation, such as a quality problem or a cost reduction program.

Cause-and-effect diagram



This cause-and-effect (or fishbone) diagram illustrates various factors that contribute to a quality problem.

To create a cause-and-effect diagram

- 1** Start Visio 2000. In the Welcome To Visio 2000 dialog box, click OK.
- 2** In the Choose Drawing Type dialog box, click Flowchart.
- 3** In the Drawing Type box, double-click Cause-And-Effect.
The drawing page opens with a partially created cause-and-effect diagram.
- 4** From the Cause-And-Effect Diagram Shapes stencil, drag the cause shapes, effect shapes, and category shapes you want onto the drawing page to complete the diagram.
- 5** To add text to the shapes in your diagram, select the shape you want, and then type.
- 6** To add text to your diagram, click the text tool (**A**) on the Standard toolbar, place the cursor where you want the text to appear, and then type.

For details about adding hyperlinks to diagrams, see “Publishing diagrams to the Web” on page 137.



For details, use these online Help keywords:

- *Cause-and-Effect solution*

Creating cross-functional flowcharts

Cross-functional flowcharts show how a process flows from department to department, whereas other flowcharts simply illustrate the steps in a process. For example, if you want to show your executive staff how a business process works and how it affects various departments in your organization, you can create a cross-functional flowchart to illustrate your concept.

You specify the orientation of your cross-functional flowchart by using special shapes, called functional band shapes. Functional band shapes have labels to identify the processes in your flowchart.

Using Visio 2000, you can create multiple-page cross-functional diagrams without starting each new page from scratch.

Creating horizontal or vertical cross-functional flowcharts

You can create either horizontal or vertical cross-functional flowcharts that have either orientation, depending upon which layout best conveys your information.

You can use functional band shapes to represent functional units in which process steps occur. You use these shapes to determine the orientation of your diagram.

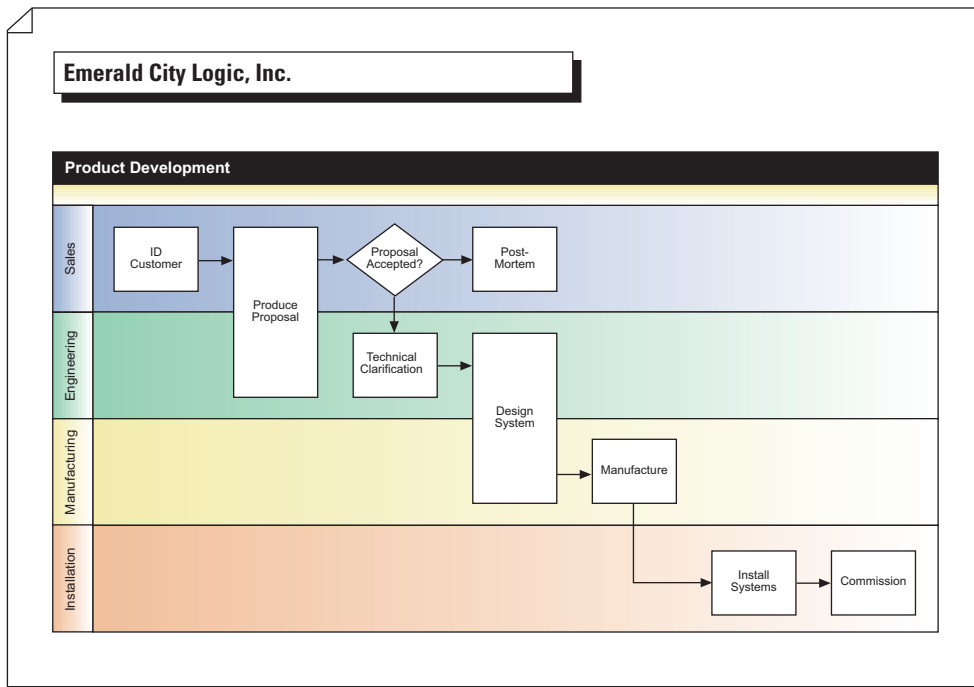
To create a horizontal or vertical cross-functional flowchart

- 1 Start Visio 2000. In the Welcome To Visio 2000 dialog box, click OK.
- 2 In the Choose Drawing Type dialog box, click Flowchart.
- 3 In the Drawing Type box, double-click Cross-Functional Flowchart.
- 4 In the Cross-Functional Flowchart dialog box, specify the band orientation, the initial number of bands you want in your diagram, and whether you want a Title Bar in your diagram, and then click OK.
- 5 From the Basic Flowchart Shapes stencil, drag a Process shape to the appropriate location on the drawing page for the first step in the process. Click to select the shape, and then type to label it.
- 6 Click the connector tool () on the Standard toolbar. With the first shape still selected, drag a second shape onto the drawing page.
The shapes connect automatically.
- 7 Continue adding shapes until all the shapes you want are on the page.

Each new shape connects to the shape that is selected at the time you add it.

- 8 Click to select the Connector shape, and then type the name of the input or output it represents.
- 9 If necessary, you can add more bands to the existing diagram. Drag a Functional Band shape from the Cross-Functional Shapes stencil, and drop it over the line you want it to follow.

TIP To reorder functional band shapes, select the label of the band you want to move, drag it so that the top left corner of the band is over the band you want it to follow, and then release the mouse button.



Cross-functional flowchart

This cross-functional flowchart uses horizontal functional bands to illustrate how processes flow through and affect departments.

Creating multiple-page cross functional flowcharts

When you add a new page to your cross-functional flowchart, Visio 2000 asks you if you want to copy the functional bands from the current page to the new page, so you don't have to create the page from scratch.

To create a multiple-page cross-functional flowchart

- 1 Right-click the Page tab, located in the lower left area of the drawing page, and then click Insert Page on the shortcut menu.
- 2 In the Page Setup dialog box, choose the settings you want, and then click OK.
- 3 In the Cross-Functional Flowchart dialog box, click OK if you want to copy the functional bands from the current page to the new page. If not, click Cancel.

If you choose to copy the bands, a set of bands with the same labels and relative positions as the bands on the current page appear on the new drawing page.

NOTE *When you delete a functional band shape from your diagram, shapes contained in the functional band are also deleted, and any other functional band shapes in your diagram are repositioned.*

For details about numbering shapes, “Working with large flowcharts” on page 94.

For details about adding a color scheme, see “Defining and editing styles” on page 146.

Importing flowchart data from other applications

You can use Visio 2000 to automatically create a flowchart from information in a text file or in Microsoft Excel format. You can either import this information from a program that supports flowchart data export, or you can create a new text file or Excel file using the Import Flowchart Data Wizard, and then create your flowchart from that data.

To import flowchart data

- 1 Start Visio 2000. In the Welcome To Visio 2000 dialog box, click Cancel, and then choose Tools > Macros > Flowchart > Import Flowchart Data Wizard.
- 2 On the first wizard screen, click Next.
- 3 On the second wizard screen, choose Read Data From Existing File, type the name of the file or click Browse to locate the text (.txt) or Excel (.xls) data file from which you want to create a flowchart, and then click Next.
- 4 Click Finish.

If your file is in text (.txt) format, Visio 2000 asks you to indicate the separator character you used between fields, the text delimiter character, and the character that includes comments. Choose the separators, and then click OK.

To create a text file or Excel file and then generate a flowchart

- 1 Start Visio 2000, and then choose Tools > Macros > Flowchart > Import Flowchart Data.
- 2 On the first wizard screen, click Next.
- 3 On the second wizard screen, choose Enter Data In A New Text File or Enter Data In A New Microsoft Excel Workbook, and then click Next.
- 4 On the next wizard screen, choose either Use Visio Flowchart - Basic Template, or Use Custom Template.

If you choose Custom Template, click Browse to locate the template you want, and then click OK.

You might want to create a custom template to create your own flowchart shapes to reuse in future diagrams. For details about creating custom templates, see “Designing your own templates” on page 147.

- 5 If you choose to open a new text file in step 3, the wizard prompts you to type a name for the file. When you click Next, a text file opens that includes instructions for setting up the data file column headings.

If you choose to open a new Excel Workbook in step 3, the wizard provides information about moving between Excel and Visio. When you click Next, a workbook opens with the column headings already in place.

- 6 Enter data in the text file or workbook template, and then save the file.
- 7 Choose Tools > Macros > Flowchart - Import Flowchart Data Wizard. When the wizard asks you for the data file you want to use, choose the text or Excel file you just created. Follow the wizard screens to generate your flowchart automatically.

Chart your organization

The Organization Chart solution in Microsoft® Visio® 2000, Professional Edition contains the stencils and tools you need to create simple organization charts as well as large, multiple-page organization charts.

Using organization charts, you can

- View your entire company or specific departments at a glance.
- Store information about employees, such as salary, title, department, and phone number.
- View reporting relationships.

Visio 2000 also provides a wizard you can use to create organization charts automatically from existing information. For example, you can create an organization chart that shows the hierarchical relationships you have already captured in an e-mail application.

Topics in this chapter

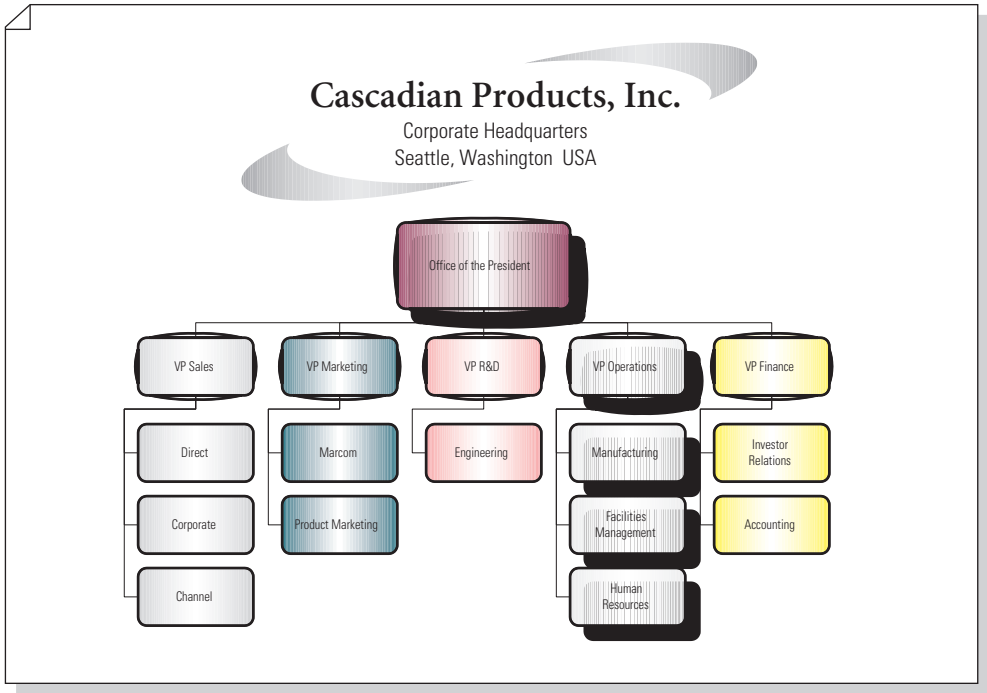
<i>Charting your organization</i>	<i>104</i>
<i>Managing large organization charts</i>	<i>107</i>
<i>Comparing and updating information in organization charts</i>	<i>109</i>
<i>Creating an organization chart from existing information</i>	<i>110</i>
<i>Using design themes and color in your organization charts</i>	<i>112</i>

Charting your organization

You can create an organization chart easily and quickly using shapes that connect automatically as you drop them on the page. Just drop shapes on top of the shapes they report to, and Visio 2000 automatically connects and aligns them.

All the shapes and tools you need to work with and manage your organization chart come with the Organization Chart template.

Organization Chart



Organization charts show hierarchies of positions and departments. You can quickly add color to differentiate departments and positions in your chart.

To start your organization chart diagram

- 1 Start Visio 2000. In the Welcome To Visio 2000 dialog box, click OK.
- 2 In the Choose Drawing Type dialog box, click Organization Chart.
- 3 In the Drawing Type box, double-click Organization Chart.
- 4 From the Organization Chart Shapes stencil, drag the Executive shape onto the drawing page.

The Connecting Shapes dialog box appears, and displays a visual demonstration of how to quickly add subordinate positions. Check the Don't Show This Message Again box if you do not want to view the dialog box again.

To add names and titles

- 1 On the drawing page, select the shape, and then type the person's name.
- 2 Press the Enter key, type the person's title, and then click anywhere outside the shape.

TIP To quickly convert a shape type into another position, right-click the shape, choose *Convert Shape* and then select the position you want.

Adding departments and positions

After the Executive, or top level, position is in place, you can add and label positions that report to the top position.

To add and label reporting positions

- 1 From the Organization Chart Shapes stencil, drag a Manager shape directly on top of the Executive shape to establish a reporting relationship.

The Manager shape connects and aligns properly below the Executive shape.

NOTE Connector shapes are added automatically when you drop a shape on top of a shape it reports to.

- 2 To add the text you want, select the Manager shape, and then type. Repeat these steps for each Manager shape you add.
- 3 To establish a reporting relationship to the Manager, from the Organization Chart Shapes stencil drag a Position shape directly on top of a Manager shape. Repeat to add more positions.

As you add shapes, Visio 2000 automatically realigns all of the reporting shapes to make room for the shapes you add.



For details, use these online Help keywords:

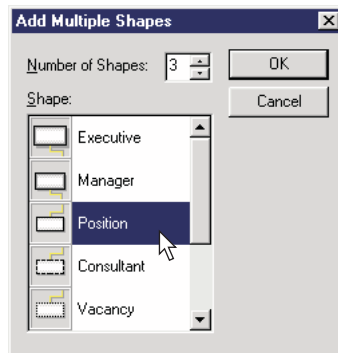
- Shape basics
- Text and text blocks

Adding multiple shapes to your chart

You can use the Multiple Shapes shape on the Organization Chart Shapes stencil to add from 1 to 50 shapes of the same type to your diagram.

To add multiple shapes to your chart

- 1 From the Organization Chart Shapes stencil, drag the Multiple Shapes shape onto the drawing page.
- 2 In the Add Multiple Shapes dialog box, for Number of Shapes, select the number of shapes you want to add.
- 3 Select the shape you want from the Shape list, and then click OK.

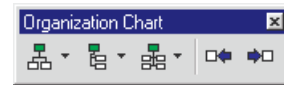


You can add up to 50 shapes at once to your chart using the Multiple Shapes shape.

TIP To show or hide subordinate positions in organization charts, select the shape representing the top level position, and then choose Organization Chart > Hide Subordinates.

Changing the layout of shapes in your organization chart

You can change the layout of your organization chart whenever you want to modify the configuration of departments and positions in your diagram.



The Organization Chart toolbar is displayed by default so you can quickly change the hierarchical structure of departments and move shapes.

To change the layout of shapes

- 1 Choose View > Toolbars > Organization Chart.
- 2 Select the top level shape that has the immediate subordinates for which you want to change the layout.
- 3 Click the layout button you want to use on the Organization Chart toolbar.
- 4 Fine-tune your layout as follows:
 - To make a shape report to a different top-level shape, drag the shape on top of the shape you want it to report to.
 - To change the location of a shape within a specific reporting structure, select the shape you want to move, and then click the appropriate Move Shapes button (icon).

Storing information in your organization chart

You can add information to shapes in your organization chart to use for reports or for reference. Such information is called a custom property.

Many Visio shapes, including organization chart shapes, come with custom properties already designated. All you have to do is type in the data. For example, Organization Chart shapes have custom properties for Department and Telephone. You can refer to this information anytime you want to by simply right-clicking a shape in your diagram.

To store information in your organization chart shapes

- 1 Select the shape you want to add information to.

- 2 Choose Shape > Properties.

The Custom Properties dialog box appears.

- 3 In the Custom Properties dialog box, type the information you want in each field, and then click OK.

TIP To add new custom properties, or edit or delete existing custom properties for shapes, click Define in the Custom Properties dialog box, and then make the changes you want.

To change custom properties

- 1 Right-click the shape, and then choose Shape > Custom Properties.
- 2 In the Custom Properties dialog box, click Define, and then add, change, or delete the properties you want to change.



For details, use these online Help keywords:

- Custom properties
- Organization Chart solution
- Reports

Managing large organization charts

You can create an organization chart that spans multiple drawing pages. You can also set up large charts so that multiple appearances of a specific person in the chart are updated together. If you change the information or layout position for that person, you need to do it only once.

Visio 2000 also makes it easy to navigate the pages of large organization charts and to quickly locate a specific person.

Creating large organization charts across multiple pages

To display all the departments and positions in your company, you may want to use multiple pages.

When you've added all the shapes you want to the first drawing page, you can add a new page to continue building your chart and still maintain relationships across the drawing pages. You add the new page by creating a synchronized copy of a department on the new page. Changes you make to any repeated shape then carry over to each appearance of that shape.



To easily navigate to another page in a multiple-page diagram, click the page tabs at the bottom of the drawing page.

To create a synchronized copy of a department on a new page

- 1 With your organization chart open, select the shape you want to place at the top level of the new page, and then choose Organization Chart > Create Synchronized Copy.
- 2 Click OK to open a new drawing page that displays a copy of the shape you selected and any shapes that are subordinate to that shape.

If you want to hide the subordinate positions, check the Hide Subordinates On Original Page box.

The new shapes are synchronized with the original shapes so that changes you make appear in both places.

- 3 To continue building the department, drag new shapes on top of the shape you copied.
- 4 Click the Page-1 tab at the bottom of the drawing page window to go back to your original drawing page.
- 5 To display hidden subordinates, right-click a stacked shape (one that appears to have other shapes under it), and then choose Show Subordinates.

NOTE *When you use the copy and paste command, or Ctrl+drag to copy synchronized shapes in organization charts, the shapes you copy are not synchronized with the original shapes.*

Deleting shapes in synchronized copies

When you delete a shape from the original page or from a synchronized copy, the shape is removed from each page in your diagram by default. Visio 2000 prompts you to let you know that all synchronized copies of deleted shapes will be deleted. You can click Cancel to remove the synchronization from the deleted shapes, allowing the synchronized copies to remain.

To delete a shape in a synchronized copy

- Select the shape you want to delete in the synchronized copy, and then press the Delete key.

A message appears asking you if you want to delete all copies of the synchronized shape, or if you want to unlink the affected shapes from their synchronized copies, so that the synchronized copies can remain.

Locating a person in your organization chart

You can use the Find Person dialog box to navigate directly to a specific person in your chart. The shape representing the person you specified is selected on the appropriate drawing page.

To find a person in a multiple-page organization chart

- 1 Choose Organization Chart > Find Person.
- 2 In the Find Person dialog box, type the name of the person you want to locate.

Comparing and updating information in organization charts

You can compare information from different versions of your organization charts. The ability to view differences between previous and current organization charts is useful when you have frequent changes and need to communicate those changes to others.

You can use the Compare Organization Data command to view a report on the differences between current and previous versions of your chart.

You can also update an older organization chart with new information at the same time.

NOTE When you update an existing organization chart, Visio 2000 preserves the formatting of the original diagram.

To compare and update organization charts

- 1 Choose Organization Chart > Compare Organization Data.
- 2 In the Compare Organization Data dialog box, select the name of the older diagram you want to compare from My Drawing To Compare, and then select the diagram you want to compare it with from Drawing To Compare It With.

NOTE If the diagrams you want to compare are not already open, click Browse to locate them.

- 3 In the Compare Type section, choose one of the following options.

My Drawing Is Older Choose this option if your diagram is a previous version and you want to update it with new information.

My Drawing Is Newer Choose this option if you want to view a report of the changes made since the original diagram was created.

- 4 Click OK.
- 5 The Comparison Report dialog box appears and displays the differences between the two diagrams.

If you selected My Drawing Is Older in Step 3, here you can click Update Drawing to update your older diagram with information from the newer one.

NOTE You can also click the Save As Text button if you want to save this information in a file to distribute or refer to at a later time.



For details, use these online Help keywords:

- Organization Chart solution
- Pages

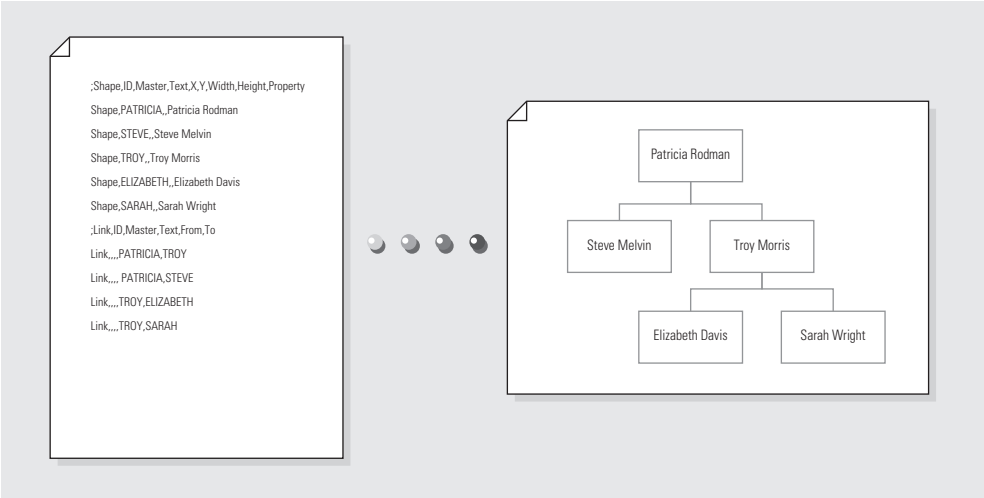
Creating an organization chart from existing information

You might want to use electronic data files that currently exist somewhere in your organization to create your chart. For example, many corporations use information files such as Microsoft Excel spreadsheets to record and update employee names, titles, reporting structure, and so on. Using the Organization Chart Wizard, you can generate an organization chart from such a data file.

You can use an infomation file such as a text file, Excel file, Microsoft Exchange Server directory, or other ODBC-compliant data source.

NOTE *If you do not already have a data file, you can run the Organization Chart Wizard to open a data file template in text (.txt) or Excel (.xls) format and build your chart by typing into a spreadsheet format rather than dragging shapes.*

Creating an organization chart from a text file



You can create an organization chart from data in an existing text file using the Organization Chart Wizard.

As you proceed through the Organization Chart Wizard, you can specify

- Data you want the wizard to display on the organization chart shapes, such as Name, Title, and Department.
- Fields from your information file that you want to use as custom properties in your organization chart shapes.
- Whether you or the wizard determines the number of positions to display on each page.

To create an organization chart diagram using the Organization Chart Wizard

- 1 Choose Organization Chart > Organization Chart Wizard.
- 2 On the first wizard screen, click Next.
- 3 On the second wizard screen, do one of the following:
 - If you choose A Text, Org Plus (*.txt), or Microsoft Excel File, or An ODBC-Compliant Data Source, click Next. On the following screen, choose the file or data source you want to use, and then proceed to Step 4.
 - If you choose A Microsoft Exchange Server Directory, click Next and proceed to Step 4.
- 4 On the next wizard screen, choose the column fields in your data file that contain the information that defines the organization.
- 5 On the next wizard screen, choose the information you want to display on your organization chart shapes, such as Name and Position.
- 6 On the next wizard screen, choose the fields you want to add to your organization chart shapes as custom property fields. Click Add to move a selection from the Data File Columns box to the Custom Property Fields box.
- 7 On the next wizard screen, do one of the following:
 - Specify how much of your organization to display on each drawing page. Then, on the subsequent wizard screens, specify the data you want to appear on each page of the organization chart. On the last wizard screen, click Finish.
 - Choose to have Visio 2000 determine how much information appears on the drawing pages for you. Click Finish.

NOTE *The Organization Chart wizard screen settings remain from the last time you used the wizard.*

Using design themes and color in your organization charts

Whether you're planning to use your organization chart in a presentation, or you just want to try a different look for your chart, you can quickly change the appearance of your diagram.

You can also add a color scheme to your chart for visual impact. For example, you might want to use the company colors in your chart for a sales presentation. Using color in organization charts also helps differentiate departments and positions.

To change the design theme for your chart

- 1 Choose Organization Chart > Options.
- 2 In the Options dialog box, select the theme you want to use from the Org Chart Theme list, and then click OK.

To add a color scheme to your organization chart

- 1 Choose Tools > Macros > Visio Extras > Color Schemes.
- 2 In the Color Schemes dialog box, select the scheme you want from the Choose A Color Scheme list, and then click OK.

Plan your project

If your job involves planning projects and processes, you need ways to track tasks and resources. You can use Microsoft® Visio® 2000, Professional Edition diagrams to help you track project milestones, resources, and tasks.

For example, you can

- Show tasks, dependencies, and resource information, such as who is responsible for which tasks, using timeline diagrams.
- Organize tasks and timeframes during the beginning stages of your project using PERT (Program Evaluation and Review Technique) charts.
- Use more detailed Gantt charts to display and track tasks and dependencies.
- Display your monthly, quarterly, and yearly goals on calendars.

Topics in this chapter

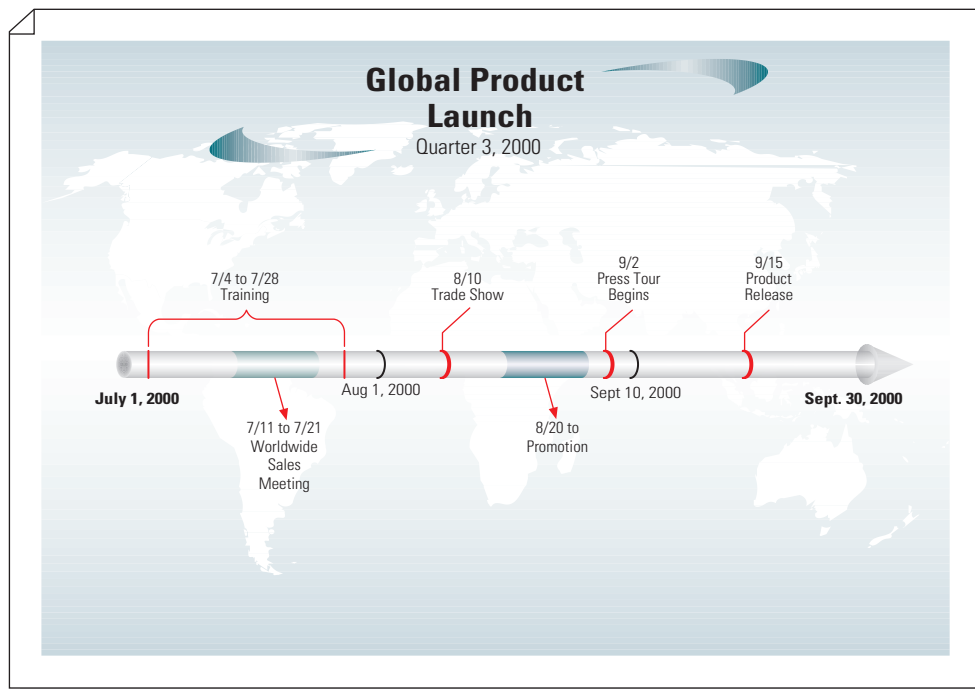
<i>Creating a timeline for a project overview at-a-glance</i>	<i>114</i>
<i>Managing high-level projects with PERT charts.....</i>	<i>116</i>
<i>Working with Gantt charts to keep on track</i>	<i>118</i>
<i>Creating calendars to stay organized</i>	<i>123</i>

Creating a timeline for a project overview at-a-glance

When you are planning a project, it's a good idea to create a simple timeline to document the major milestones and tasks that will be required. Then you can easily distribute your timeline to

coworkers or import it into another application. For example, you could import it into Microsoft PowerPoint® to use in a presentation.

Timeline



You can use timelines to communicate major project milestones.

To create a timeline

- 1 Start Visio 2000. In the Welcome To Visio 2000 dialog box, click OK.
- 2 In the Choose Drawing Type dialog box, click Project Schedule.
- 3 In the Drawing Type box, double-click Timeline.
- 4 From the Timeline Shapes stencil, drag a Timeline shape onto the drawing page.
- 5 In the Configure Timeline dialog box, choose the timeline beginning and end date, the time scale, and the date and time scale formatting.
- 6 To have the Visio program automatically update the dates on your marker shapes when you move them, check the Automatically Update Dates When Markers Are Moved box.

The Visio program draws a timeline that begins and ends with the dates you chose.
- 7 To add a right or left arrowhead to your timeline, right-click the timeline shape, and then choose either Show Right Arrowhead or Show Left Arrowhead.

To add a milestone

- 1 From the Timeline Shapes stencil, drag a Milestone shape onto your timeline.
- 2 In the Configure Milestone dialog box, choose the milestone date and the date format you want, and then click OK.

The Visio program positions the milestone on the timeline using the milestone date you chose.

To add an interval

- 1 From the Timeline Shapes stencil, drag an Interval shape onto your timeline.
- 2 In the Configure Interval dialog box, choose the marker beginning date, end date, and date format.

The Visio program positions the marker on the timeline using the marker beginning and end dates you chose.

TIP To add a color scheme to your diagram, choose *Tools > Macros > Visio Extras > Color Schemes*, and then choose the color scheme you want, or create a new one.

For details about adding hyperlinks, see “Adding hyperlinks to diagrams” on page 138.



For details, use these online Help keywords:

- Timeline solution
- Color schemes

Revising your timeline

After you create a timeline, you can revise and format the timeline as well as the shapes on it. You can specify default behavior for marker shapes on your timeline that lets you change milestone or interval dates by dragging them.

To revise a timeline

- 1 Right-click the timeline, and then choose **Configure Timeline** from the shortcut menu.
- 2 In the **Configure Timeline** dialog box, revise the timeline data, and then click **OK**.

To change a milestone date or format

- 1 Right-click the milestone, and then choose **Configure Milestone** from the shortcut menu.
- 2 In the **Configure Milestone** dialog box, revise the milestone data, and then click **OK**.

To change interval dates or format

- 1 Right-click the interval, and then choose **Configure Interval** from the shortcut menu.
- 2 In the **Configure Interval** dialog box, revise the interval data, and then click **OK**.

For details about printing diagrams, see “Printing your diagrams” on page 134.

Managing high-level projects with PERT charts



For details, use these online Help keywords:

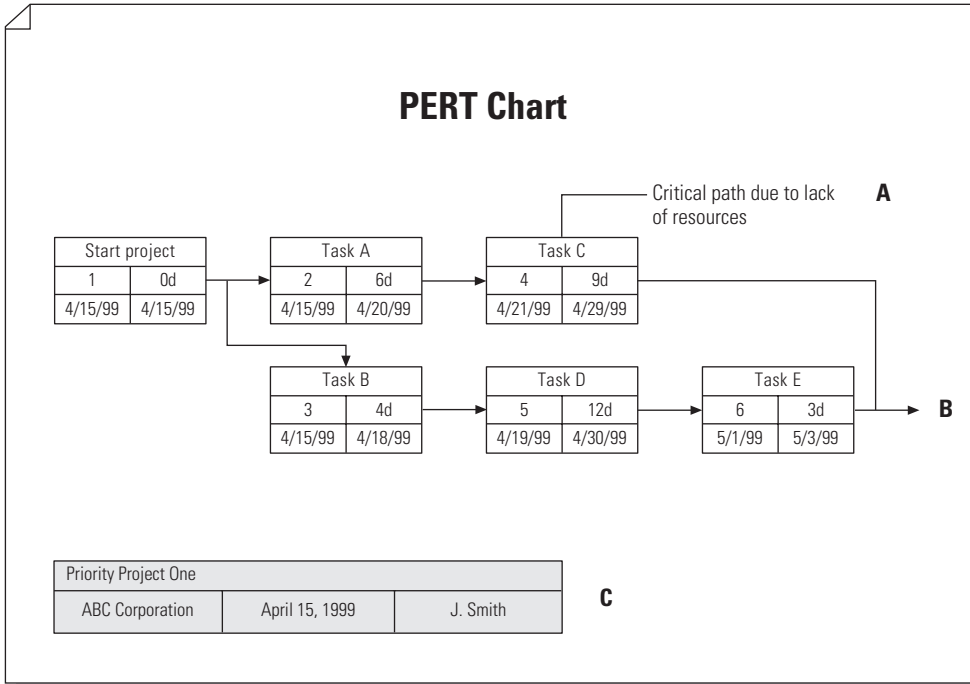
- *PERT Chart solution*

You can create PERT charts to diagram your high-level projects quickly. For example, if you have established goals for your department, you can use a PERT chart to illustrate the steps that are required to meet those goals.

To create a PERT chart

- 1 Start Visio 2000. In the **Welcome To Visio 2000** dialog box, click **OK**.
- 2 In the **Choose Drawing Type** dialog box, click **Project Schedule**.
- 3 In the **Drawing Type** box, double-click **PERT Chart**.
- 4 From the **PERT Chart Shapes** stencil, drag a PERT shape onto the drawing page.
- 5 To replace the existing task name, select the shape, and then type.

- 6 To replace the existing task areas, click the shape, click the task area inside the shape, and then type.
- 7 Repeat steps 4 through 6 as necessary to add other PERT chart task shapes.
- 8 Click the connector tool () on the Standard toolbar, click a connection point on a PERT chart shape, and then drag to a connection point on another PERT chart shape. Repeat as necessary to connect all the PERT Chart shapes.



PERT chart

Use PERT charts to display the steps required for a project.

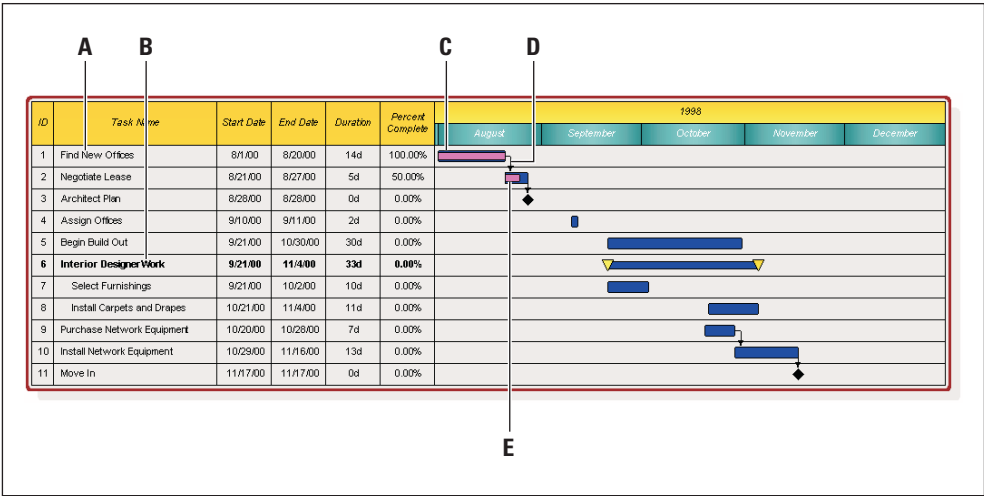
- A** To define critical path text, add callout shapes, and then type the text you want.
- B** To indicate the flow of your chart, add line ends.
- C** To identify your diagram, add a legend shape, and then type the text you want.

Working with Gantt charts to keep on track

When the details of your business project are confirmed, you can create diagrams in Visio 2000 that make it easy to track and update the task-specific information you need. Using these charts, known as Gantt charts, you

can specify dependencies between tasks and update them as your project progresses, so you can see how changes in a given task affect others in your project.

Gantt chart



- A Each task name is listed.
- B Summary tasks have one or more subtasks below them.
- C A Gantt chart task bar is a visual representation of the duration of a task.

- D Connector lines between task bars indicate linked tasks.
- E Completion percentage for a task appears as the color magenta in the task bar.

To create a Gantt chart

- 1 Start Visio 2000. In the Welcome To Visio 2000 dialog box, click OK.
- 2 In the Choose Drawing Type dialog box, click Project Schedule.
- 3 In the Drawing Type box, double-click Gantt Chart.
The Gantt Chart Options dialog box appears.
- 4 On the Date tab, enter the number of tasks, the time units, and the date type you want.
- 5 Click the Format tab, specify the format you want to use for task bars, milestones, and summary bars in your chart, and then click OK.

A project frame appears on the drawing page that includes ID, Task Name, Start, End, and Duration columns, a row and task bar for each task, and a timescale that begins with the date you specified in the Gantt Chart Options dialog box.

Adding and deleting tasks in your Gantt chart

As your project develops, you often need to add and delete tasks in your Gantt chart. Each row in your Gantt chart represents a task.

To add a task to your Gantt chart, do one of the following:

- Drag a Row shape from the Gantt Chart Shapes stencil onto a row. A new row is created where you drop the shape.
- Select any shape in the chart (except a column shape), and then choose Gantt Chart > Insert Task.

The new task is inserted above the task that contained the selected shape.

NOTE *If you increase the size of the Project Frame shape, new tasks are added to the chart. The number of tasks added depends on the amount by which you resize the Project Frame.*

To delete a task from your Gantt chart

- Select the Task Bar shape or any shape in the task you want to delete, and then press the Delete key.

The first time you delete a summary task (a task having one or more subordinate tasks), the Visio program prompts you to choose whether to delete the subtasks associated with the summary task.

Adding subtasks in your Gantt chart

You can break tasks into smaller tasks by creating subtasks.

To create a subtask

- Select the task you want to change to a subtask, then choose Gantt Chart > Demote Task.

5	Begin Build Out	
6	Interior Designer Work	
7	Select Furnishings	9/21
8	Install Carpets and Drapes	1
9	Purchase Network Equipment	10/26

When you create a subtask, the “parent” task (Interior Designer Work) displays special indicators (inverted triangles) at the beginning and end of the task bar, and the text in the task name column for the subtask is indented. The parent task is then known as a summary task.

Adding and deleting columns in your Gantt chart

When you create your Gantt chart, it has a default set of columns. You might, however, want to add new columns to your Gantt chart or delete columns you no longer need. For example, you might want to add a column to your Gantt chart to display task notes, and then want to delete it later when the notes are no longer applicable. There are several ways to add or delete columns in your chart.

To add a column to your Gantt chart

- 1 Do one of the following:
 - Right-click the Project Frame, a column, or a text entry shape, and then choose Insert Column from the shortcut menu.
 - Drag a Column shape from the Gantt Chart Shapes stencil into the Gantt chart where you want it to appear.
- 2 In the Insert Column dialog box, select the type of column you want to insert, and then click OK.

To delete a column from your Gantt chart, do one of the following

- Right-click a column or text entry shape in the column, and then choose Delete Column from the shortcut menu.
- Select the column you want to delete, and then press the Delete key.

Changing the start date, end date, and duration of a task

As you work on a Gantt chart, you can change start and end dates and durations to reflect your project’s progress. You can make these changes in three ways: by typing new dates or durations, by dragging a Task bar shape, or by choosing a date and time.

To type a new start date, end date, or duration

- Select the cell that contains the date or duration, and then type the new date or duration. For duration, use the following abbreviations: m for minutes, h for hours, d for days, and w for weeks.

To drag a task bar

- Select the task bar, and then drag the green selection handle (■) until the task bar is the length you want.

The dates in the Start Date, End Date, and Duration columns reflect the changes you made.

To choose a date and time

- 1 Right-click a cell in the Gantt chart that contains the data or duration you want to change, and then select Edit Date.
- 2 In the Choose Date/Time dialog box, click the arrow next to the Date field, and then click the date you want on the calendar.

Use the left and right arrows on the calendar to move to different months.

Linking and unlinking tasks in your Gantt chart

You can easily link tasks in your Gantt chart to show how tasks depend on each other in your project. When you change the date or time for a task that is linked, the linked task updates automatically.

To link tasks

- 1 Select the task bars and milestone shapes you want to link.
To select multiple tasks, hold down the Shift key while you select.
- 2 Choose Gantt Chart > Link Tasks, or click the Link Tasks button (🔗) on the Gantt Chart toolbar.

TIP You can also drag the Link lines shape from the Gantt Chart Shapes stencil, and then connect one end of the shape to one task bar and the other end to another task bar.

To unlink tasks

- 1 Select the tasks you want to unlink.
To select multiple tasks, hold down the Shift key while you select.
- 2 Choose Gantt Chart > Unlink Tasks, or click the Unlink Tasks button (🔗) on the Gantt Chart toolbar.

Exchanging information for your Gantt chart

Visio 2000 provides import and export commands so you can exchange data with Microsoft Project and other project management tools that use the MPX file format. You can also enter project information into a Microsoft Excel workbook or text file.

For example, you can prepare a presentation that includes project data currently maintained in Project. You can import information from Project, annotate your timeline, or add formatting and a color scheme to make your diagram more visually appealing to your audience.



For details, use these online Help keywords:

- Gantt Chart solution

To generate a Gantt chart from a data file

- 1 Start Visio 2000. In the Welcome To Visio 2000 dialog box, click Cancel.
- 2 Choose Tools > Macros > Project Schedules > Import Project Data.
- 3 In the Import Project Data dialog box, choose from the following options.

Enter Data In New Text File Choose this option to open a text (.txt) file template where you can enter data from which you can create a Gantt chart.

Enter Data Into New Microsoft Excel Workbook Choose this option to open a Microsoft Excel (.xls) template where you can enter data from which you can create a Gantt chart.

Read Data From Existing File Choose this option if you already have a data file containing schedule data from which you want to generate a Gantt chart. Click Browse to locate the file.

- 4 Click OK, and then follow the instructions to create your Gantt chart.

To export a Gantt chart

- 1 Open the Gantt chart you want to export.
- 2 Choose Gantt Chart > Export.
- 3 In the Save As dialog box, type a name for the file, choose a location, and then click Save.

Printing a Gantt chart

Most Gantt charts are too large to print on one regular-sized printer page, so your project timeline is likely to print, or tile, across several pages.

Before you print:

- Make sure the printer page and drawing page orientations are the same. Choose File > Page Setup, and then click the Page Size tab to check the drawing page orientation. Click Setup on the Print Setup tab to check the printer page orientation.
- Turn on Page Breaks so you can see how many pages the timeline will require and where the page breaks fall. To turn Page Breaks on, choose View > Page Breaks.
- Set your margins to control the overlap between printed pages. To set margins, choose File > Page Setup, and then click Setup.
- Preview how the diagram will print before you print it. To preview, choose File > Print Preview.

For details about printing and publishing your diagrams, “Printing your diagrams” on page 134 and “Publishing diagrams to the Web” on page 137.

Creating calendars to stay organized

Planning and tracking resources and tasks for your projects are critical to your success. You can create monthly and yearly calendars to keep an eye on the day-to-day details as well as the big picture.

After entering the calendar information, you can resize your calendar proportionally, label special days, add simple timelines, and add notes to personalize the calendar.

To create a calendar

- 1 Start Visio 2000. In the Welcome To Visio 2000 dialog box, click OK.
- 2 In the Choose Drawing Type dialog box, click Project Schedules.
- 3 In the Drawing Type box, double-click Calendar.
- 4 From the Calendar Shapes stencil, drag the Large Month shape and drop it onto the drawing page.
The Custom Properties dialog box appears.
- 5 In the Custom Properties dialog box, choose the calendar properties you want, and then click OK.
- 6 To add text to a day, select the shape, and then type.

Creating single- or multiple-page calendars

You can create a calendar for a single month on a single page, you can create a calendar for the entire year on a single page, or you can create a calendar for different months on separate pages, all in one Visio drawing file.

NOTE *To create a calendar with months on separate pages, simply insert a page for each monthly calendar and create a calendar on each page.*

To create a calendar for a year on one drawing page

- 1 From the Calendar Shapes stencil, drag the Yearly Calendar shape onto the drawing page.
The Custom Properties dialog box appears.
- 2 In the Custom Properties dialog box, type the year, specify the day on which the week begins, and then click OK.

For details about printing and distributing diagrams, see Chapter 11, “Share your diagrams with others.”

Monthly calendar

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Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday																																																															
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5	6	7 Staff meeting 2pm Room 1-C	8	9 Product Training 3rd Floor Training Room 9:30 - 4pm	10 3rd Floor Training Room 9:30 - 4pm	11																																																															
12	13 ★ All Company Meeting Conference Center 1 - 5pm	14	15	16	17 ● Management Workshop 8am - 12noon Room 3-A	18																																																															
19	20 Vacation!	21	22	23 ■ Demo Team meeting 10am Room 1-A ■ Manager's meeting 2pm Room 1-C	24	25																																																															
26	27	28	29 ★ Product Demo 1pm - 3pm Demo Room	30	31																																																																

Monthly calendars can help you and others plan for project goals and milestones, such as team meetings and presentations. You can use color to highlight important dates.

Other business diagrams: office layouts, maps, and forms

With Microsoft® Visio® 2000, Professional Edition, you can create many types of diagrams that support your business environment, such as

- Scaled office layouts to prepare your company for a big move.
- Geographical and directional maps to display your business location locally or globally.
- Business forms tailored to your company: invoices, order forms, business cards, letterhead, and more.

Topics in this chapter

<i>Planning space with office layouts</i>	<i>126</i>
<i>Creating maps</i>	<i>130</i>
<i>Creating business forms.....</i>	<i>132</i>

Planning space with office layouts



For details, use these online Help keywords:

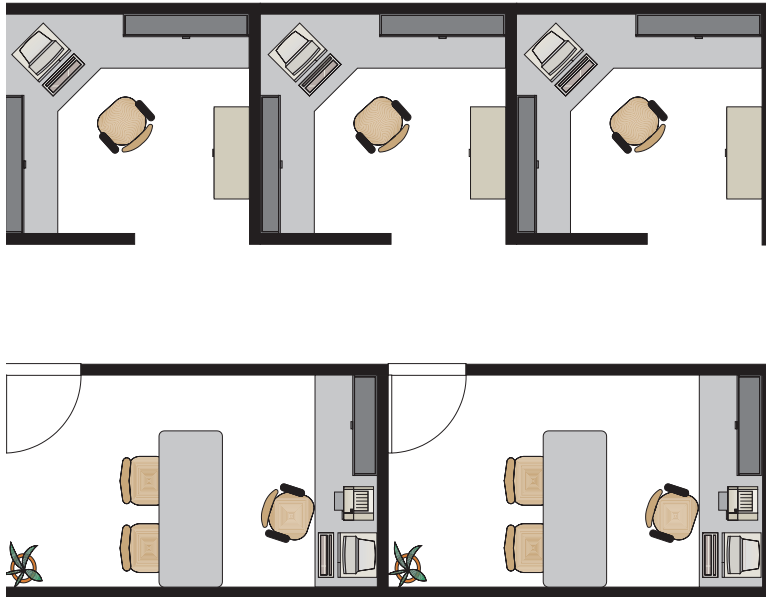
- *Office Layout solution*
- *Layering shapes*

You can use Visio 2000 to create accurately scaled office layouts during any space planning process. Office layouts, or space plans, are essential for

- Preparing for an office move.
- Remodeling the interior of an office building.
- Documenting the existing layout of a building.

You can use layers to highlight certain shapes—the movable furnishings, for example—so they can be identified at a glance.

Office layout



You can create office layouts to depict a building's interior, including the location of walls, doors, windows, and office furniture.

Creating office layouts

You can create office layouts using Visio 2000 in two ways, depending on the complexity of the space involved.

- To create a quick office layout, you can drag a Room shape onto the drawing page, resize it, and then add other office shapes, such as desks, furniture, doors, and windows you want to use.
- To diagram an office that has a more complex shape, you can drag Space shapes onto the drawing page, convert the edges of the space shapes to walls, and then add any other office shapes you want to use.

TIP *If your office layout consists of many identical cubicles, you can select all of the shapes in the first cubicle, and then click the Stamp tool () to duplicate it.*

To create an office layout using a Room shape

- 1 Start Visio 2000. In the Welcome To Visio 2000 dialog box, click OK.
- 2 In the Choose Drawing Type dialog box, click Office Layout.
- 3 In the Drawing Type box, double-click Office Layout.
- 4 From the Office Layout Shapes stencil, drag a room shape, such as the “T” Room or the “L” Room, that best represents the type of room you want to draw, onto the drawing page.

Guides appear, which you can drag to resize the room to the dimensions you want.

- 5 From the Office Layout Shapes stencil, drag the shapes you want to use, such as doors, windows, desks, computers, chairs, and modular panels, to fill in the space.

TIP *To quickly resize doors and windows, you can drag a control handle (). Door shapes also have control handles you can use to change the direction and angle of the door swing.*

To create an office layout using Space shapes

- 1 From the Office Layout Shapes stencil, drag space shapes, such as the “T” Space shape or the “L” Space shape, onto the drawing page, one at a time.
- 2 Overlap the space shapes to approximate the floor plan shape you want, and then select all of the space shapes.
- 3 Right-click the selected shapes, and then choose Union from the shortcut menu.
- 4 Right-click one of the selected shapes, and then choose Convert To Walls from the shortcut menu. The Convert To Walls dialog box appears.
- 5 Under Settings, specify the actions you want.

Add Dimensions Check to have dimensions calculated and displayed for the new walls.

Add Guides Check to have guides appear for the new walls. Be sure to check this option if you plan to resize spaces.



To select multiple shapes, click a shape, hold down the Shift key, and then click the other shapes.

- 6 Under Original Geometry, choose one of the following options.

Delete Deletes the original shape after the conversion.

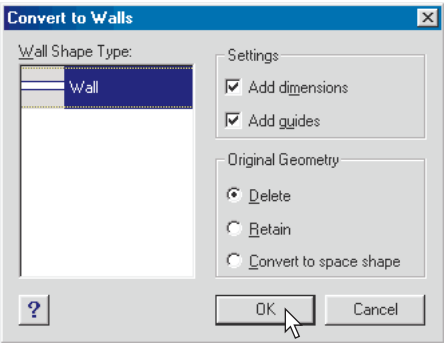
Retain Preserves the original shape after the conversion.

Convert To Space Shape Converts the original shape to a space shape after the conversion.

- 7 Click OK.

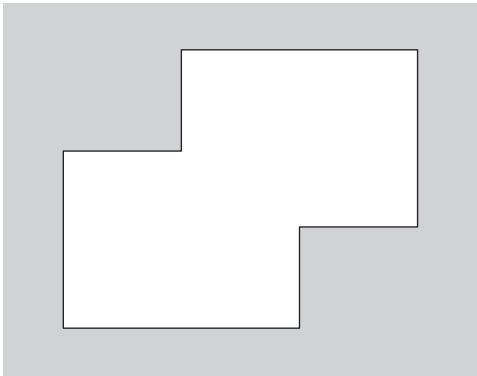
After converting the Space shape to walls, you can resize it by dragging the guides.

From the Office Layout Shapes stencil, drag the shapes you want to use, such as doors, windows, desks, computers, chairs, and modular panels, to fill in the space.

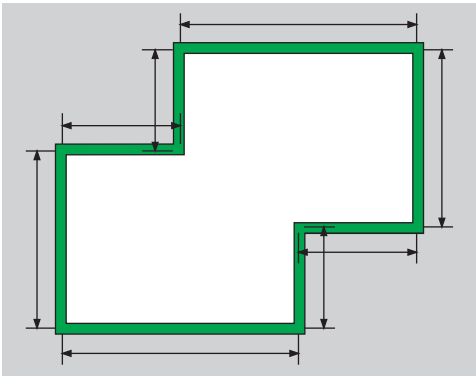


By default, only one wall shape type is available in the Convert To Walls dialog box. If you create new masters based on the Wall shape, they appear as options in the Wall Shape Type list.

**Converting shapes
to walls**



Two space shapes that were overlapped and merged to form a single shape before being converted to walls.



The space shape as it appears after the conversion. You can use guides and dimensions for easy resizing.

Using layers to distinguish office components

You can use layers to control which elements on your diagram are locked, colored, printable, visible, or have snap and glue active, at any given time. For example, if you're using a diagram as both a construction plan and a facilities plan, and the facilities department wants to see furniture but not dimensions, and the construction department wants to see dimensions but not furniture, you can use one diagram and simply set the layers you want to be visible for each department.

When you create a diagram based on the Office Layout drawing type, the office layout shapes are already assigned to preexisting layers. You can add your own shapes to those layers, or create new layers and add shapes to them.

To modify layer properties in your diagram

- 1 Choose View > Layer Properties.
- 2 In the Layer Properties dialog box, check the options you want. Uncheck an option to deactivate it for that layer.

To assign a shape to another layer in your diagram

- 1 Select the shape(s) you want to assign to another layer in your diagram.
- 2 Choose Format > Layer.

TIP You can assign shapes to layers using the Format Shape toolbar. Select the shape, and then choose the layer from the Layer list on the Format Shape toolbar.

- 3 In the Layer dialog box, select the layer to which you want to assign the shape(s), and then click OK.

Drawing to scale

Office layouts are real-world diagrams. To create office layout diagrams accurately, you should set an appropriate drawing scale so that the shapes represent their actual size in the real world, but still scale properly on your drawing page.

You can change drawing scale settings in the Page Setup dialog box.

To set a drawing scale for your diagram

- 1 Display the page for which you want to set a drawing scale.
- 2 Choose File > Page Setup, and then click the Drawing Scale tab.
- 3 In the Drawing Scale section, under Pre-defined Scale, choose the standard architectural scale you want.

NOTE By default, the Office Layout template opens with a drawing scale of 1/4 inch = 1 foot. The page size is 8.5 x 11 inches and the page orientation is landscape (wide).

Visio 2000 redraws the page and adjusts the rulers to reflect the new settings.



For details, use these online Help keywords:

- Office Layout solution
- Drawing scales

Creating maps

You can create directional or geographical maps with Visio 2000. Directional maps include roads, trees, bridges, rivers, houses, buildings, road signs, and other landmarks. Geographical maps include states, countries, provinces, and continents.

Locating your business with directional maps

You can use directional maps to provide directions with landmarks, such as directions to a company event.

To create a directional map

- 1 Start Visio 2000. In the Welcome To Visio 2000 dialog box, click OK.
- 2 In the Choose Drawing Type dialog box, click Map.
- 3 In the Drawing Type box, double-click Directional Map.
- 4 Start your map by dragging a road shape from the Road Shapes stencil onto the drawing page. Then you can add other shapes, such as landmarks.

To specify the road thickness, right-click the road shape, and then select the road thickness you want.
- 5 From the Landmark Shapes stencil, add landmarks, such as lakes and rivers, and buildings, or other structures. Edit the shapes as needed.

For details about editing shapes, see “Moving and resizing shapes” on page 24.
- 6 Label roads and other shapes by selecting the shapes and typing the text you want.
- 7 To add scale and directional indicators to the map, drag shapes from the Landmark Shapes stencil.

Creating geographical maps to diagram your business globally

You can create geographical maps to document locations. For example, if you're a sales manager, you can present new sales territories at a company meeting or diagram the locations of your corporate offices worldwide.

To create a geographical map

- 1 Start Visio 2000. In the Welcome To Visio 2000 dialog box, click OK.
- 2 In the Choose Drawing Type dialog box, click Map.
- 3 In the Drawing Type box, double-click Geographic Maps.
- 4 Drag the geographic shapes you want the region to include from a stencil to your drawing page.
- 5 Choose Edit > Select All.
- 6 Right-click a shape, and then choose Arrange To Page.

The shapes form an appropriately sized and aligned region.



For details, use these online Help keywords:

- Geographic Map solution

Map Diagram



Geographical map

Geographical maps can illustrate your company's global strategies.

Creating business forms



For details, use these online Help keywords:

- *Form Design solution*
- *Graphics*

You can quickly design and create the business forms you use every day, such as invoices, timesheets, and order forms. Visio 2000 provides some shapes that are completed forms, including business card and letterhead shapes. You can drag these shapes onto the drawing page, and then configure them to your company's requirements.

To create a business form

- 1 Start Visio 2000. In the Welcome To Visio 2000 dialog box, click OK.
- 2 In the Choose Drawing Type dialog box, click Forms and Charts.
- 3 In the Drawing Type box, double-click Form Design.
- 4 From the Forms Shapes stencil, drag column, line, box, and grid shapes onto the drawing page to create the spaces you want for your form.

- 5 If you want to create repeating elements, select the shapes you want to duplicate, and then press Ctrl+D to duplicate shapes.
- 6 Drag a border shape onto the drawing page, and then drag a selection handle to resize it to fit your form.
- 7 Press Shift+Ctrl and drag to zoom in so you can align parts of the form framework with one another and with the border.

To create a business card

- 1 From the Forms Shapes stencil, drag the Business Card shape onto the drawing page.
- 2 To replace existing text, select the shape, select the text you want to replace, and then type. To move to the next line, press the Enter key.

Share your diagrams with others

After you create a diagram, you can print it for coworkers or business clients, or publish it to a company's intranet or Web site.

You can also

- Automatically update your diagrams with any new information by adding hyperlinks to shapes.
- Route your diagrams to other departments for comments and evaluation.

Topics in this chapter

Printing your diagrams..... 134

Publishing diagrams to the Web..... 137

Routing your diagrams for comments 140

Printing your diagrams

In Microsoft® Visio® 2000, Professional Edition, most drawing types are set up so that the drawing page and printed page sizes are the same, so you don't have to change page settings to get the printed diagram you expect. You can view your diagrams before you print them to make sure they print the way you want.

If you want to change the size, orientation, or scale of the drawing page as you create your diagram, keep the following terms in mind as you set up your diagram for printing:

- The drawing page is the white page you see on the screen.
- The printer page is the paper in the printer on which you print your Visio diagram.
- The printed diagram is your end result: the image on your drawing page printed onto one or more printer pages.

Using print preview to view your diagram

You can preview your diagram before you print to make sure you get the results you expect.

If you preview your diagram and notice that the drawing page and printer page orientations do not match, you should adjust either your printer page or drawing page settings so the two match.

To preview a diagram before printing

- Click the Print Preview button () on the Standard toolbar.

To match the printer page orientation to the drawing page orientation

- 1 Choose File > Page Setup.
- 2 In the Page Setup dialog box, specify the drawing page orientation as Portrait (taller than it is wide) or Landscape (wider than it is tall).

Print setup for large and multiple-page diagrams

When you work with large diagrams, it's possible to have a drawing page that is larger than the printer page. If the size of a diagram is larger than the paper in your printer, Visio 2000 tiles the diagram, which means that the diagram appears across several sheets of paper.

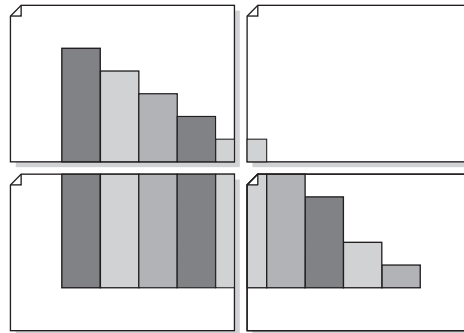
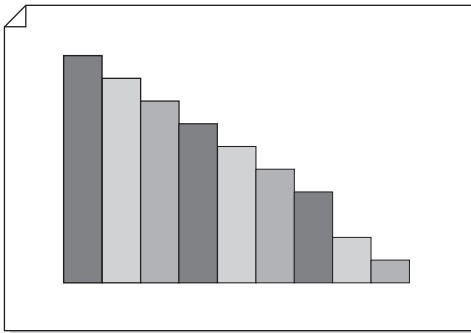
For example, if you create a large organization chart and, in order to accommodate the diagram on your printer page, you increase the size of the drawing page without changing the paper size in your printer, Visio 2000 prints the diagram across as many pages as necessary.

You can preview a large diagram to see if it will require more than one printer page. When you know your diagram will appear across multiple printer pages, you can choose how much a tiled diagram overlaps on adjacent pages. This gives you some room to overlap the parts of the diagrams so that they fit together as a whole. You can also specify the number of pages you want your diagram to be tiled over.

To determine whether a large diagram will print on several pages

- Choose View > Page Breaks.

Gray bands appear on the drawing page, indicating the printer page size and margins selected in the Print Setup dialog box.



Printing large diagrams

You can print a diagram on large printer paper or across several smaller sheets of paper.



For details, use these online Help keywords:

- *Drawing scales*
- *Printing*

To reduce or enlarge the size of a printed diagram

- 1** Choose File > Page Setup.
- 2** On the Print Setup tab, under Print Zoom (All Pages), choose one of the following options:
 - To reduce the size of the diagram, select Adjust To, and then type a number less than 100.
 - To enlarge the size of the diagram, select Adjust To, and then type a number greater than 100.
 - To set the diagram to print across multiple sheets of paper, select Fit To, and then type the number of pages across and down on which you want the diagram to print.
- 3** Look at the preview to see if your drawing page and printer page are the way you want, and then click OK.

To increase the area where tiled diagrams overlap

- 1** Choose File > Page Setup, and then on the Print Setup tab click the Setup button.
- 2** Type larger amounts for the margin settings, and then click OK.

The larger the margins, the greater the overlap.
- 3** Click OK in the Page Setup dialog box.

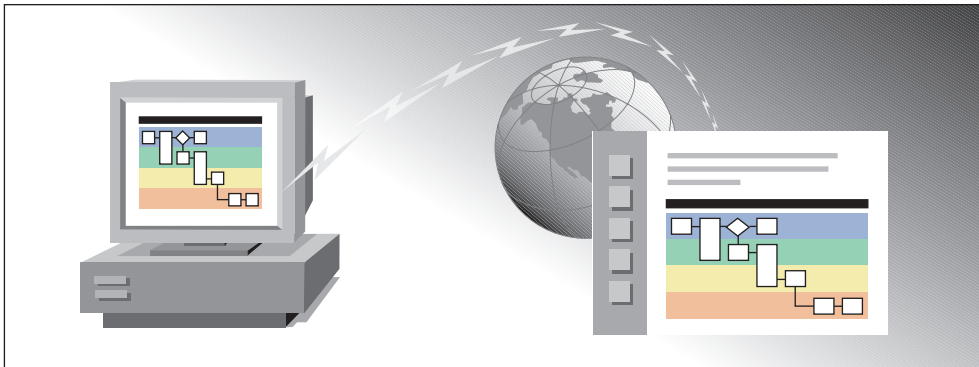
To specify the number of pages for a tiled diagram

- 1** Choose File > Page Setup, and then on the Print Setup tab click the Setup button.
- 2** Under Print Zoom, select Fit To, and then specify the number of sheets across and down. Choose the number of pages that represents an area proportionate to the drawing page.
- 3** Click OK in both the Print Setup and Page Setup dialog boxes.

Publishing diagrams to the Web

With Visio 2000, publishing your diagrams to the Internet or an intranet site is as easy as saving a file. Visio 2000 automatically adds the HTML codes necessary to display the diagram in a Web browser, so all you have to do is make sure your diagram looks the way you want.

You can make your diagram a launching point for users who want more detail and related information by adding hyperlinks to shapes. When users click a “hot” shape, they jump to the linked location.



**Converting
Visio diagrams
to Web pages**

You can easily convert Visio diagrams to Web pages by saving them in HTML format.



For details, use these online Help keywords:

- **Hyperlinks**
- **HTML and Internet tools**

Adding hyperlinks to diagrams

You can add one or more hyperlinks, or jumps, to Visio shapes and drawing pages. A link can jump to another page in the same Visio diagram, another Visio diagram, or a non-Visio document.

When you add hyperlinks to other pages in the same diagram, you can use them to move among pages in the Visio diagram. For example, you can link a Process shape in a flowchart to Total Quality Management (TQM) documentation in a Microsoft Word document for that process.

When you link a shape or page to a file, you can decide whether the path to the link should be a relative path or an absolute path.

Relative path A relative path describes the location of the linked file in relation to the Visio diagram or another path (set on the Summary tab in File > Properties). You can move the Visio diagram and the linked file together (that is, move the entire path structure) without breaking the link, but if you move the diagram or file separately, you break the link.

Absolute path An absolute path spells out the exact location of the linked file in terms of drive, folder, and file name. You can move the Visio drawing file without affecting the link, but if you move the linked file, you must reset the path.

To link a shape or page to another Visio drawing page, a Web page, or a non-Visio file

- 1 Create or open a Visio diagram. To add a link to a page, display the page with nothing selected. To add a link to a shape, select the shape.

NOTE *If you are linking to a Visio 2000 diagram, make sure to save the diagram so that you can open the source to which you are linking.*

- 2 Choose Insert > Hyperlink.
- 3 Do one of the following:

To link to a Web site For Address, type the Web site's URL.

If you don't know the URL, click Browse, and then choose Internet Address to open your default Web browser.

To link to a file For Address, click Browse, and then click Local File. Navigate to the file you want, and then click Open. (If necessary, change the type of file in Files Of Type.)

- 4 If you are linking to a file and you want to display a particular page, click Browse next to Sub-Address, select the page you want, and then click OK.
- 5 Under description, type a name for the link that identifies the location to which you're linking.

- 6 Do one of the following:

To specify an absolute path Uncheck Use Relative Path For Hyperlink.

To specify a relative path Check Use Relative Path For Hyperlink. To set a path that is not based on the location of the Visio diagram, choose File > Properties. For Hyperlink Base, type the base path that you want.

- 7 If you want to add another hyperlink for the selected shape or page, click New, and then repeat steps 3 through 6.
- 8 If you want to link to another page within the document, or to a shape in the document, click the Browse button to the right of Sub-Address, specify the page, shape, and zoom level you want, and then click OK.

Converting diagrams to HTML

After you create Visio 2000 diagrams, you can convert them into Web pages with links to other Web pages by saving them as HTML files.

To convert a diagram to an HTML file

- 1 Open the diagram you want to save as an HTML file, and then choose File > Save As.
- 2 Type a name for the HTML file, using the .htm extension, such as diagram.htm.
- 3 For Save As Type, choose HTML Files (*.htm, *.html), and then click Save.
- 4 In the Save As HTML dialog box, accept the default settings, and then click OK.
You are prompted to view the HTML pages.
- 5 Click Yes to view the new Web pages in your default browser.

Routing your diagrams for comments

You can use e-mail to send a Visio diagram to another user. For example, if you need information from coworkers to complete your diagram, you can route the diagram to them electronically and ask for their comments.

The Visio program also lets you take advantage of Microsoft Office routing features, including sending diagrams to Microsoft Exchange folders, adding routing slips to diagrams you send by means of e-mail, and adding journal entries to Microsoft Outlook®.

NOTE *Visio products are compatible with electronic mail programs that support the Messaging Application Program Interface (MAPI) protocol.*

To send a diagram with a routing slip

- 1 Display the diagram you want to send, and then choose File > Send To > Routing Recipient.
- 2 In the Routing Slip dialog box, click Address to open your address list, select the individuals or groups to whom you want to route your diagram, and then click OK.
- 3 If you want to route the diagram to people in a specific order, select a person's name, and then click the up or down arrow in the Move section to change that person's position in the list.

- 4 Under Route To Recipients, specify whether to route the diagram to one person at a time or to everyone at once.

If you choose to route the diagram to one person at a time, the first person on the list views or updates the diagram, routes the diagram to the next person, and so on.

If you route the diagram to a designated group (called a group alias), all group members will receive the diagram at the same time.

- 5 Check Track Status to receive an update as each person on the list passes the diagram to the next person, or check Return When Done if you'd rather not see the diagram again until everyone has seen it.
- 6 Under Message Text, type the text you want in the e-mail message, and then click Add Slip.
- 7 Choose File > Send To > Next Routing Recipient to send the diagram to the first person on the routing list.

TIP *If you receive a routed diagram and want to route it to the next person, choose File > Next Routing Recipient.*

Go further: creating shapes, styles, and templates

As well as providing you with ready-to-use solutions, Microsoft® Visio® 2000, Professional Edition gives you the flexibility to build your own. You can create your own shapes and styles that you and others can reuse.

You can, for example,

- Use drawing tools or menu commands to create or customize shapes, and add these shapes to stencils for use in future diagrams.
- Create new styles, such as color fills and text styles, that you can reuse to give shapes a consistent look and make them easier to revise.
- Create new templates that include stencils and drawing page settings you know you'll use again.

Topics in this chapter

<i>Creating your own shapes</i>	<i>142</i>
<i>Reusing shapes you create and save</i>	<i>144</i>
<i>Defining and editing styles</i>	<i>146</i>
<i>Designing your own templates.....</i>	<i>147</i>

Creating your own shapes



When you use the pencil, line, rectangle, or ellipse tool, try holding down the Shift key while you draw, to see how that constrains the drawing behavior.

There are several ways to create your own shapes in Visio 2000. You can

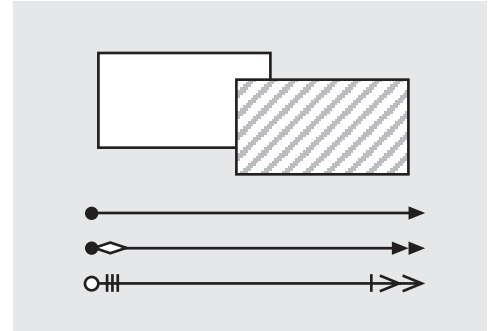
- Draw a shape from scratch using Visio drawing tools, such as the line, rectangle, ellipse, and freeform tools. For example, if you want to add a freeform arrow to a block diagram, you can draw the arrow with the freeform tool (↷).
- Merge a shape with other shapes to create a new, unique shape. For example, if you want to create a round sign with an arrow in its center, you can place an arrow shape on top of a circle and then use the Combine command to create the shape you want.
- Revise an existing Visio shape to create a new, unique shape. For example, if your company uses a special process shape in flowcharts, you can modify the Visio Process shape, save it on the Basic Flowchart Shapes stencil, and then use it in future flowchart diagrams.

Using Visio drawing tools to create shapes

When you use the Visio drawing tools to create shapes, keep in mind that a shape can be either open or closed.

Open shapes are lines, arcs, or zigzag shapes. You can format their ends, but you can't fill them with colors or patterns because they contain no enclosed space.

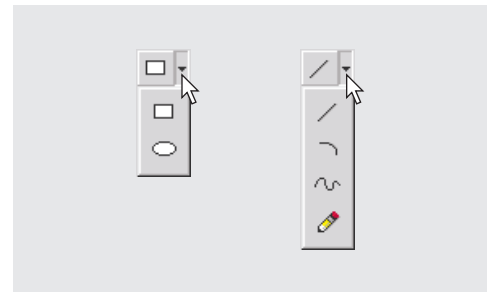
Closed shapes, such as rectangles or circles, are surrounded by a continuous line. You can fill them with colors and patterns.



You can apply a pattern to a closed shape, such as a rectangle. You can add ends to open shapes, such as lines.

To draw a shape from scratch using the Visio drawing tools

- 1 Choose a drawing tool from the Standard toolbar.
- 2 Click and drag on the drawing page to create the shape you want.



Click the arrow next to the rectangle tool and the line tool to see more Visio drawing tools.

Merging existing shapes to create new shapes

An easy way to create a complex shape is to select simple shapes and then use the shape operation commands, such as Fragment, Combine, and Union, to create the new shape.

NOTE The new shape you create using any shape operation command inherits the formatting of the first shape you select.

Using shape operations commands

Command	Result	Example
Fragment	Breaks a shape into smaller parts or creates new shapes from intersecting lines or from 2-D (two-dimensional) shapes that overlap.	
Combine	Creates a new shape from selected shapes. If the selected shapes overlap, the area where they overlap is cut out (discarded), creating a cookie-cutter effect.	
Union	Creates a new shape from the perimeter of two or more overlapping shapes.	
Subtract	Creates a new shape by subtracting the area where selections overlap from the primary selection.	
Intersect	Creates a new shape from the area where the selected shapes overlap, eliminating non-overlapping areas.	
Offset	Creates a set of parallel lines or curves to the right and left of the original shape.	



For details, use these
online Help keywords:

- Drawing tools
- Multiple shapes

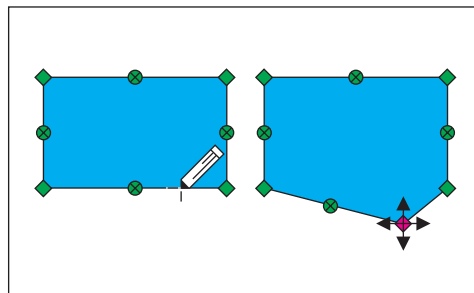
Revising existing shapes

You can revise any Visio shape or shape you draw from scratch as long as the shape isn't locked to prevent specific changes. When a shape is locked, you see padlocks in place of corner handles when you select the shape.

When you select shapes for revision using the pencil tool () , the line tool () , the arc tool () , or the freeform tool () , the selection handles turn into vertices () , which are green diamond-shaped handles that you can drag to change the appearance of a shape.

To revise an existing shape

- Select the shape with the pencil tool () , and then drag, add, or delete vertices () .
- To change curves, drag a control point () .



You can reshape shapes using the pencil tool. Select the shape, and then drag, add, or delete vertices.

Reusing shapes you create and save

If you've created or modified a shape and want to keep it for future diagrams, you can make the shape a master by saving it on a stencil. All masters are stored on stencils. When you drag a shape from a stencil onto the drawing page, you are creating an instance, or copy, of the master.

You can also import graphics in other formats to save as masters. For example, if your company logo is in WMF format and you use it on all of your reports, you can import it into a Visio diagram, and then save it as a new master on a stencil.

Adding your own shapes to a stencil

If you want to reuse your own shapes the next time you open a particular drawing type, you can save your own shapes to existing stencils in your diagram, and then save the file as a template (.vst).

You can also create a new stencil, and then add your own shapes as well as any existing Visio shapes you want to it. Then, you can save the stencil in a template file, so that you and others can reuse it in other diagrams.

To add your own shape to an existing stencil

- 1 Open the template containing the stencil you want to add your own shape to.
- 2 Click the icon on the stencil title bar (), and then choose Edit from the menu.

A red asterisk appears on the stencil icon () to indicate that the stencil is editable.

- 3 Hold down the Ctrl key, and then drag your own shape from the drawing page onto the stencil.
A new icon representing your own shape appears on the stencil with a generic name, such as Master .01.
- 4 Click the new master on the stencil, click it again, and then type the name you want for the new shape.

- 5 Click the stencil icon (), and then choose File > Save As to open the Save As dialog box. Navigate to the Solutions folder in which you want to save the stencil, and then type a name for the stencil in the File Name box. For Save As Type, choose Stencil (*.vss), and then click Save to save your stencil.

When you open the stencil again, you can use the new shape as you do any other Visio 2000 master.

To add your own shape to a new stencil

- 1 Choose File > Stencil > New Stencil. You can also choose View > Toolbars > Stencil, and then click the New Stencil toolbar button () from the Stencil toolbar.

The new stencil appears docked to the left side of the drawing window. The stencil icon has a red asterisk () to indicate that it is editable.

- 2 Hold down the Ctrl key, and then drag your own shapes, one at a time, from the drawing page onto the new stencil.
- 3 Click the Save icon on the right side of the stencil title bar ().

The Save As dialog box appears.

- 4 In the Save As dialog box, navigate to the folder where you want to save the stencil, and then type a name for the stencil in the File Name box. Check to make sure Save As Type is Stencil (*.vss), and then click Save.

For details about saving files as templates, see “Creating and saving your own template” on page 147.



For details, use these online Help keywords:

- Masters
- Stencils
- Graphics

Defining and editing styles

A style in Visio 2000 is a named collection of formatting attributes that you can apply to your shapes. You can create styles that format the elements of a shape: fill, line, and text. For example, you might create a style that gives shapes a black outline, a green fill, and black bold italic text.

When you define or edit styles in a drawing file, the changes you make are available only in the current diagram. To make a style available for future diagrams, you can define or edit it in an existing template. The style is included in every new diagram you create.

For details about designing your own template, see “Designing your own templates” on page 147.

To define a new style

- 1 Choose Format > Define Styles.
- 2 Type a name for the new style in the Style list.
- 3 If you want to base the new style on an existing style, select that style from the Based On list.
- 4 Under Includes, check the attributes that your style includes. A style can include formatting from any combination of the three attributes.

- 5 Under Change, click Text, Line, or Fill to change the settings for each attribute you included in Step 4.
- 6 When the style contains the settings you want, click Apply to add the new style and apply it to selected shapes.

To change a style

- 1 Choose Format > Define Styles.
- 2 In the Style list, select the style you want to change.
- 3 To rename the style, click the Rename button, type a new name in the Rename Style dialog box, and then click OK.
- 4 To change style settings, click the Change button. When you finish changing the attributes, do one of the following:
 - Click Apply.
 - Click Change to add the changes and continue working in the dialog box.

For details about formatting shapes, see Chapter 1, “Visio basics.”

Designing your own templates

Designing your own template enables you to set up the Visio diagram environment, such as your page settings, tools, and stencils, exactly as you prefer. Then you can save the file as a template file and reuse it as often as you want. You can also share your customized template with coworkers.

You might want to create your own templates when your diagrams

- Require customized settings such as page size or scale, window size and position, or shape or text styles.
- Often use a particular background or set of layers. For example, if you place your company logo in every diagram, you can create a template with that background or set of layers in place.

Creating and saving your own template

The easiest way to create a template is to set up a drawing file the way you want, open the stencils you want, and then save the settings as a template (.vst) file.

If you simply want to change some of the settings of an existing Visio template, you can base a diagram on that template, save the diagram with a new name, and then make your changes.

To create and save your own template

- 1 Open your diagram or start a new diagram based on the template you want to modify.
- 2 Open any additional stencils you want to save with the template by choosing File > Stencils > Open Stencil and then choosing the stencil(s) you want.
- 3 Change drawing page settings and styles to those you want to use in future diagrams that are based on this template.
- 4 Choose File > Save As, and then do the following:
 - For Save As Type, select Template (*.vst).
 - For File Name, type a name for your template.
 - For Save, make sure Workspace is checked.
 - For Save In, select the folder in which you want to save the template.
- 5 Click Save.

Using background pages to display common page elements

You can set up background pages that appear each time your customized template opens. For example, if you want your company logo to appear on all of your future diagrams, you can create a background page that contains the logo graphic and then assign it to the foreground page. When you save the diagram file as a template, the logo appears on the drawing page each time you open the template.



For details, use these online Help keywords:

- Background pages

To create a background for a diagram

- 1 Right-click a page tab in the lower-left corner of the drawing window, and then choose Insert > Page from the shortcut menu.
- 2 On the Page Properties tab, for Type, click Background.
- 3 If necessary, click the Drawing Scale tab to change the scale or the Page Size tab to change the page size for the new page, and then click OK.
- 4 Place the design element you want to use as a background onto the drawing page.

To assign a background to a diagram

- 1 Display the page to which you want to assign the background.
- 2 Choose File > Page Setup, and then click the Page Properties tab.
- 3 In the Background list, select the name of the background that you want to assign, and then click OK.

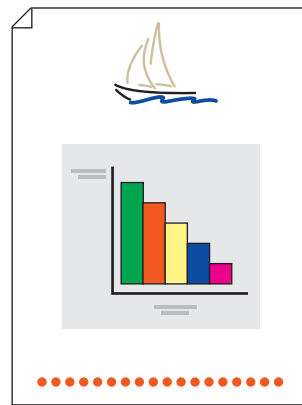
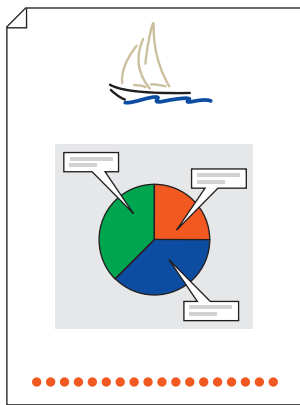
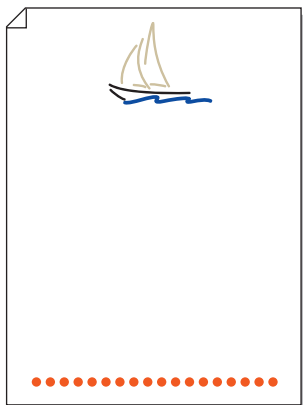
The background appears behind the shapes on the foreground page.

To display a background so you can edit it

- Display the page to which the background is assigned, and then choose Edit > Go To > Background.

For details about layers, see “Using layers to distinguish office components” on page 129.

Background pages



Use a background to repeat a common element on several diagrams. For example, the sailboat appears on each of these three pages.

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